New York, August 23, 1924

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

*Volume 64*
*Number 8*

## Psycho-Technical Tests for Vehicle Drivers

IN THE decade since the late Professor Münsterberg first proposed to American operators the application of psychological tests to platform candidates there has been a notable advance in the status of psychology itself from a mass of observation and data to that of an exact science. The Münsterberg idea can no longer be classed as chimerical and impracticable. No better proof of this can be offered than the truly classical paper, abstracted in this issue, on "Tests for Motormen and Bus Drivers" which was presented before the June convention of the International Association by L. Bacqueyrisse of the Paris surface lines. Here we have the first extended comparisons of the preliminary judgment of the laboratory and the service judgment of the operator. When psychologist and platform inspector can show 80 to 90 per cent accord, there must be something in a plan that weeds out the unfit before they can cause expense and trouble.

The notable feature of the Paris work, in particular, is the broad co-operation of psychologists and physiologists with the executive staff of the railway, and the recognition that no one or two kinds of tests will suffice for the classification of fit or unfit. Tests involving judgment of speed and distance have made exceptionally good in practice, but there is still a *terra incognita* as regards the behavior of different men under the same emotional stress. The tests for sound and its direction of origin are a long step ahead of the old days. Who does not recall this jest: "Can you hear that clock tick?" "Yes." "Well, your hearing is wonderful. It hasn't run for a week."

In these times when so many employers in other fields have persons of psychological training for employment directors to fit the applicant to the job which best suits his nature, it will not do to say, "Our business is different," when, perhaps, the real reason is that human inertia which keeps us from taking up old things in new ways because of the wrench at deep-rooted prejudices.

## Gaudy Colors for Car Painting Are Regaining Their Popularity

THE long familiar policy of economy in car painting seems likely soon to be thrown into the discard. More and more electric railway men appear to be coming around to the point of view that attractively painted cars are a good business proposition. Instead of thinking that "a penny saved is a penny earned" in the matter of car painting they are beginning to realize that a penny judiciously spent on painting may bring in a good return on the investment. An attractive exterior encourages people to ride in a car. Then too, vivid colors that can be seen a long way off have proved helpful in preventing accidents.

For example the luxurious new interurban cars of the Milwaukee Electric Railway & Light Company are painted green below the letterboard and yellow above. Green is used also for the trucks, but the wheels are yellow. What a contrast that presents to the cars so common on many roads a short time ago, painted some dull color all over. Many railways have resumed the use of gold striping to decorate the outside of their cars. Bright green, red and various shades of yellow and orange are now very common. The latter color is widely used to increase visibility. Another company has adopted blue as the color for its cars. Lettering, numbering and striping are done in some attractive contrasting color or in gold or aluminum. Altogether it begins to look as though gaudy colors are regaining their former popularity.

## If the Carfare Went from 5 Cents to $130,000,000

WHAT actually had to be done when extremes of inflation occurred was shown in the report of the Elevated and Underground Railway of Berlin for 1923, just at hand. The report shows the average fare per passenger, as measured in marks, for each month during the year. Each month this figure showed a jump ranging from an increase of a modest 5 per cent all the way up to several thousand per cent.

Starting with 49 marks in January, which, by the way, was several hundred times the pre-war fare, the fare in December of last year reached the enormous sum of 130,123,000,000 marks. This increase would correspond in American currency to a rise in the fare from 5 cents to $130,000,000 per passenger.

Of course, an attempt to do business under such conditions must have been more like a nightmare than anything else, but it is only by citing extremes that the force of the necessity for an increased railway fare with currency inflation can be made evident to some people. It is hoped that the time never will come when American electric railway companies will have to charge $130,000,000 for a car ride. But even though they fail to follow the German electric railways to that extent, the companies should be permitted to charge fares that are commensurate with the existing inflation of the currency.

There is, however, a philosophy in this country which admits of no justice in a street railway fare higher than that mentioned in the franchise of the company. People who hold this doctrine cannot see any need for higher fares, regardless of increase in length of ride or decrease in the purchasing power of money. It sometimes makes one wonder if, with a degree of inflation such as that which existed in Germany last year, Mayor Hylan would still have claimed that 5 cents

is a reasonable figure for a subway ride. Perhaps the recital of the German experience would do more to convince men of this type than any attempt to show a real justification from reams of statistics.

## The Best Form of Public Ownership in Sight

WITHIN the space of a few months, since the reorganization of the elevated lines in Chicago, the financial condition of the company has been improved to such an extent that in the five weeks of the customer and employee ownership campaign more than half of the $5,000,000 issue of preferred stock has been sold. Thus wide local ownership of the securities is being obtained as one of the first steps toward the fulfillment of the company's promises of adequate rapid transit service. In other words, the company by its active promotion of the plan, which has come to be nationally known as "Customer and Employee Ownership of Public Utilities," is actually carrying out democratization of ownership of the industry and the substitution of public ownership of the best kind for possible political ownership. There can be no quarrel with the desire of the company to accomplish these purposes except possibly from political interests, the selfish desires of which might be hurt by the process. In any event the company will secure and retain popular favor only as it deserves it. It cannot well be otherwise.

A thoughtful provision of the present issue contemplates the payment of dividends monthly. Thus the company will be in a position to keep the actual owners of the property almost constantly informed in a most direct way of the progress that the company is making. The necessary consolidations, connections and extensions of the lines can be brought about, the desirable improvements in service can be obtained, and the fare can be made moderate and reasonable, at least, on the rapid transit systems of the city, if the company receives support in the stock sale and the necessary franchises are forthcoming. In the work of securing these things the company appears to have made a good start. After all, to both the owners of the property and the public—and these give promise of being synonymous in Chicago—it is the end that matters, not so much the means.

## How Old Is Ann's Brother?

THE theory that sons never grow up has always been a cherished feeling of motherhood and at the same time an elusive hobgoblin for the railway managements to combat. The boy who is six years old at home, five years old at school and four in the street car may be considered as a paradoxical fact. Though he may have come in for a lot of hero worship, ofttimes he is the cause of altercation and humiliation and even in some instances of financial loss.

Superficially, it sounds humorous for a traction concern to sue for 14 cents and it becomes ludicrous when a counter suit is filed for $10,000. But that appears to be the high-class comedy being enacted in one of our oldest and most aristocratic cities, the principals in the cast being the street car company and one of its patrons. The patron contended that her son was four years old and therefore exempt from payment of fare. The company claimed that the boy in question was six years old, and according to law was not entitled to ride free. And so the young man entered upon his first dangerous age. The mother, humiliated and disgraced, she claims, by an uncivil conductor, sought $10,000 damages and the company with boundless faith in the innocent's "erstwhile" four years refused to be out of pocket 14 cents as his transportation fee.

It is conjectural only to assign the contenders to the side of justice but certainly at first reading the whole affair sounds like much ado about nothing. Yet the incident is reminiscent of the day not entirely gone when one frequently heard, "It's only the car company; skin them if you can for they're rich enough." It was no unusual procedure for a person, otherwise just, to "beat the company" if possible though he'd rank first in criticising the niggardly church contributor or the petty political pilferer.

If the company in this case has erred in its judgment then it must suffer the consequences, however grave, of accusation wrongly directed. If, on the other hand, the management has its facts correct the court should establish a precedent which will point the way toward a better solution of the age of Ann and her kid brothers.

## The Public Wants Service at All Hours of the Day

SOME electric railways have a policy of giving particular attention to providing good service during the rush hours, and then letting the remainder of the day take care of itself. Others, while attempting to give service in the non-rush, get the schedules so badly distorted in the rush periods that they take the greater part of the following non-rush to get the kinks untangled and the cars back on their correct time. Neither of these methods gives the best service to the riding public that can be provided.

It is true that a great portion of the revenue is obtained in the rush hours, so that it is important to have the service good enough to attract riders at that time. Unfortunately, the service is given at the greatest cost during the rush, as this paper has frequently pointed out. The less intense service of the non-rush provides the backbone of the schedule which is expanded to handle the peak loads. The greater the number of all-day cars, the less the proportionate strain on the system, particularly to provide the additional men.

These reasons point to the need for building up a good riding habit in the off-peak hours. To do this the service must be of the best, for here is where the competition of the automobile, the taxicab, and pedestrianism is keenest. With service less frequent than in the rush, a delay may be more serious to the patron. If he allows what he feels is plenty of time to catch a train, or to make an appointment, or to reach the theater in time for the performance, he is not likely to be tolerant when the car is late. Even though it be a trip to the store, the shopper prefers to spend the time looking at bargains to waiting on a corner or sitting in a stalled street car. A few such occurrences and a rider is lost.

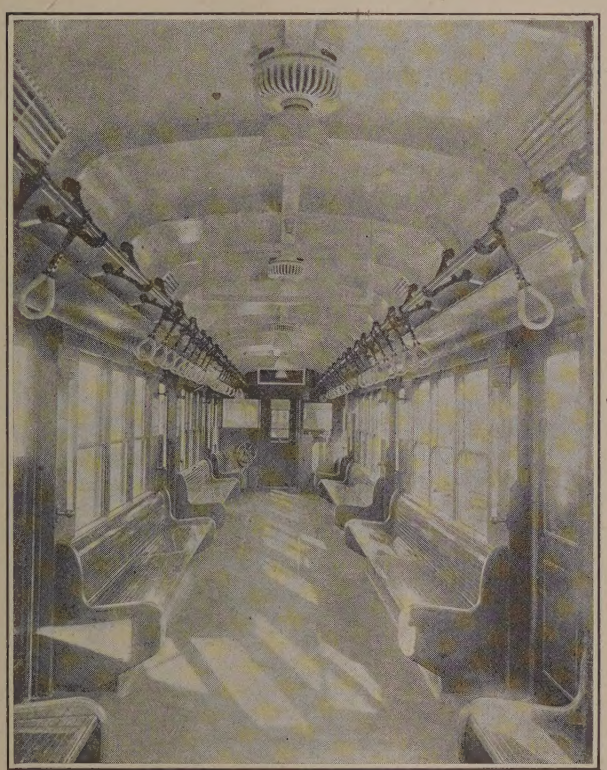
This tends to emphasize the necessity for keeping the transportation force on its toes at all times, so that during the period when there is the greatest opportunity for building up good will and increasing revenue, the service will not be found wanting. In the final analysis it is the service that will sell the rides.

# Reducing Weight of Rapid Transit Cars Saves $108,000 a Year

**Steps by Which Weight Was Reduced, Carrying Capacity Increased and Strength Maintained in New Rolling Stock for East Boston Service—Electric Door Openers Give Good Results**

*By John Lindall*
Superintendent Rolling Stock and Shops, Boston Elevated Railway

STYLES of cars change and it sometimes seems that these changes are as frequent as the changes in the styles of clothing. For instance, when the famous "hobble" skirt was in vogue, the steps of many of our cars had to be changed to meet the conditions. If it should happen that the "hoop" skirt should again come into style, we should probably have to change the cars to meet that condition! Some people seem to have the idea that when a new type of car is desired, the whole matter is conceived and developed in the brain of the car designer the same as an artist paints a picture. This is not true. There are many requirements which must be met in the design to enable the car best to meet the conditions of service. This may be more fully explained by following out, step by step, the development of our latest type, the East Boston Tunnel rapid-transit car, which has several features quite novel and somewhat radical in design.



**The East Boston Tunnel Car, While Narrower Outside than the Standard Elevated Car, Has More Room Inside**

## Special Conditions Had to Be Met

The East Boston Tunnel was built in 1900 to 1904 for the operation of surface cars run singly. It is probable that at the time when it was designed very little, if any, consideration was given to the question of train operation in the future. The tunnel was put into operation on Dec. 30, 1904, and operated with closed double truck cars with 26-ft. 6-in. bodies. As the traffic increased these cars were replaced with the largest type of car that could be used in the tunnel and on the streets. The increase in carrying capacity obtained in this way took care of the traffic growth up to 1917, when it was found that the capacity of the tunnel with single-car operation had been reached. As a means of further increasing its capacity, the operation of surface car trains was started. The number of cars in a train was gradually increased up to four. While this added materially to the carrying capacity of the tracks, it became evident that the capacity for handling passengers on the station platform also had been reached.

As several car lines were operated through the tunnel with diverse routing after leaving the East Boston end, it was impossible for each car or train to empty the station platforms, as passengers had to wait for the car or train running on their particular routes. This caused serious station-platform congestion.

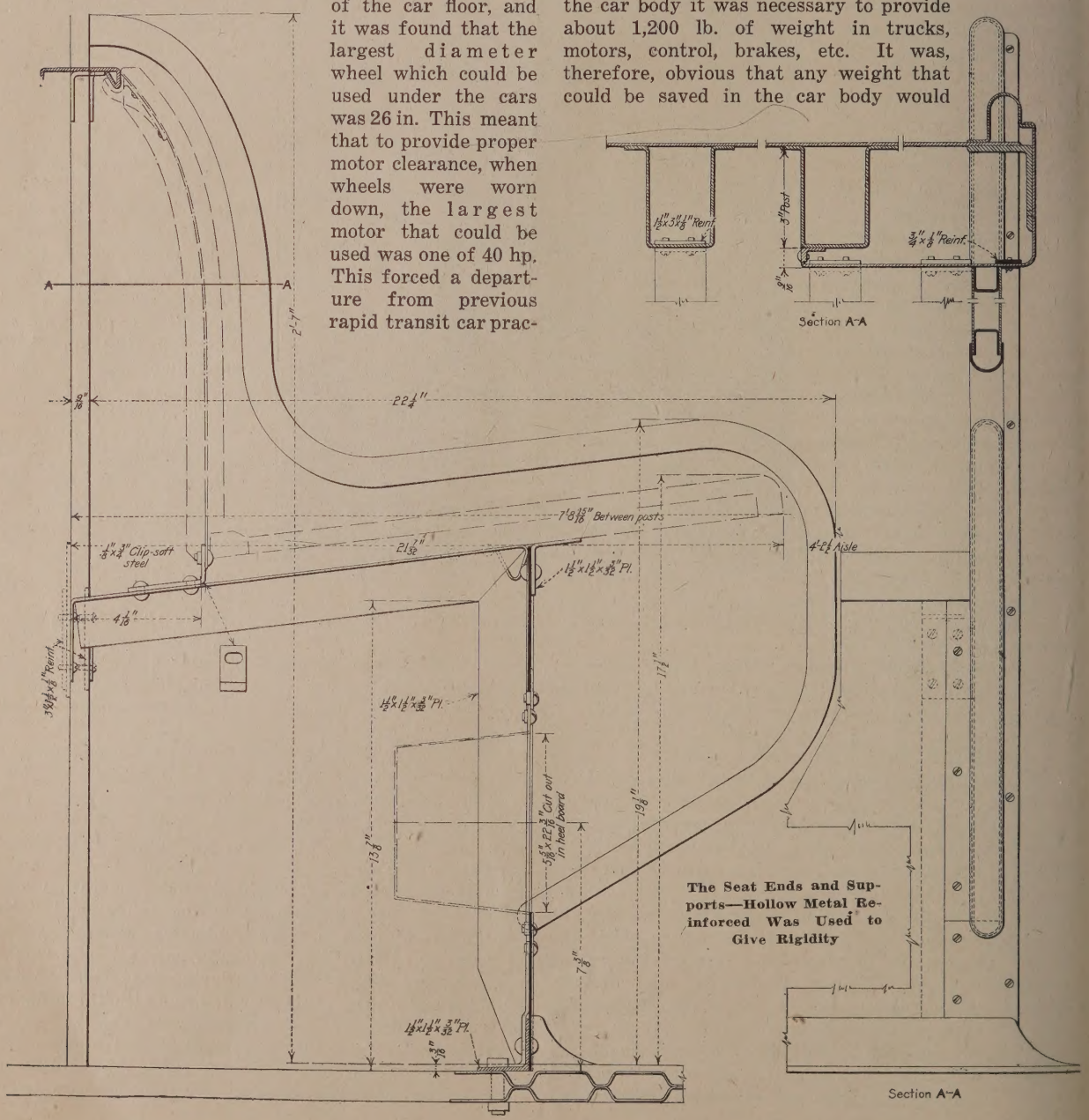
To relieve this condition and as a means of providing further increase in carrying capacity, it was decided to go to trunk-line service in the tunnel, extend the platforms for six-car trains and provide terminal facilities at Maverick Square, East Boston, for looping the tunnel trains and also the connecting surface cars, with large platforms arranged so that the transfer of passengers could be made at one level.

In operating with this arrangement the use of center-entrance motor-car trains was first considered, but this did not prove advisable for several reasons. The design and construction of the center-entrance cars were not suitable to withstand the buffing and pulling stresses which they might be subjected to when operated in six-car trains; overhead trolley operation had never been very satisfactory in the tunnel and with six trolleys on a train, more trouble was to be expected. It was also evident that the center-entrance cars would require more time at stations during heavy traffic than would a car of the rapid-transit type with three doors on a side. There was a further advantage in the rapid-transit type of car, in the reduction of trainmen required for operation, seven men being needed for a six-car train of center-entrance cars and only four for

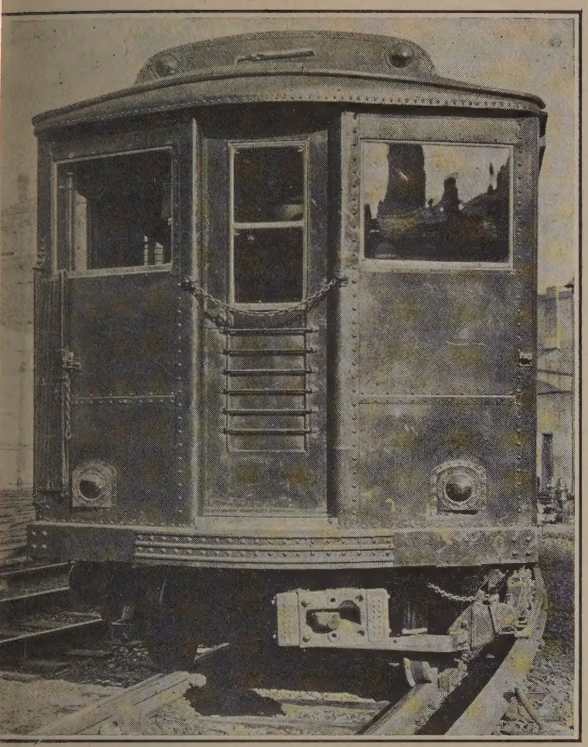
a train of the same number of cars of the rapid transit type. For these reasons, it was decided to use the rapid-transit type of car.

This question having been decided, the logical thing to do, if possible, would be to use the Cambridge subway type of car which had proved so satisfactory in that service; but when the matter of providing clearance for such a large car was looked into, it was found that the cost would be prohibitive. The next question was to determine how large a car could be operated through the tunnel without necessitating material changes in its construction. From tunnel clearance plans it was found that a car of approximately the length and width of the present elevated lines car could be used if its height could be reduced, and it was further found that on account of the low roof of the tunnel over the station platforms these platforms could only be raised to a certain height. This height determined the height of the car floor, and it was found that the largest diameter wheel which could be used under the cars was 26 in. This meant that to provide proper motor clearance, when wheels were worn down, the largest motor that could be used was one of 40 hp. This forced a departure from previous rapid transit car practice of using two motors per car, as sufficient power could not be obtained from two 40-hp. motors. As a matter of fact, it was a very serious question whether a rapid-transit type of car could be built light enough so that the total load would not exceed the capacity of the four 40-hp. motors, considering the number of stops per mile, grades, etc. We were operating the center-entrance cars of approximately 22 tons weight in that service with four 40-hp. motors. A check indicated that we could not safely go much beyond that weight. So our problem was to produce a fireproof rapid-transit type of car with stronger framing, M.C.B. wheels and heavier trucks, without exceeding the weight of the center-entrance motor car. When we considered that the last elevated cars built by this company weighed approximately 35 tons, the solution seemed quite impossible.

A comparison of the weights of the various parts of cars indicated that for every 1,000 lb. of weight in the car body it was necessary to provide about 1,200 lb. of weight in trucks, motors, control, brakes, etc. It was, therefore, obvious that any weight that could be saved in the car body would




**The Seat Ends and Supports—Hollow Metal Reinforced Was Used to Give Rigidity**



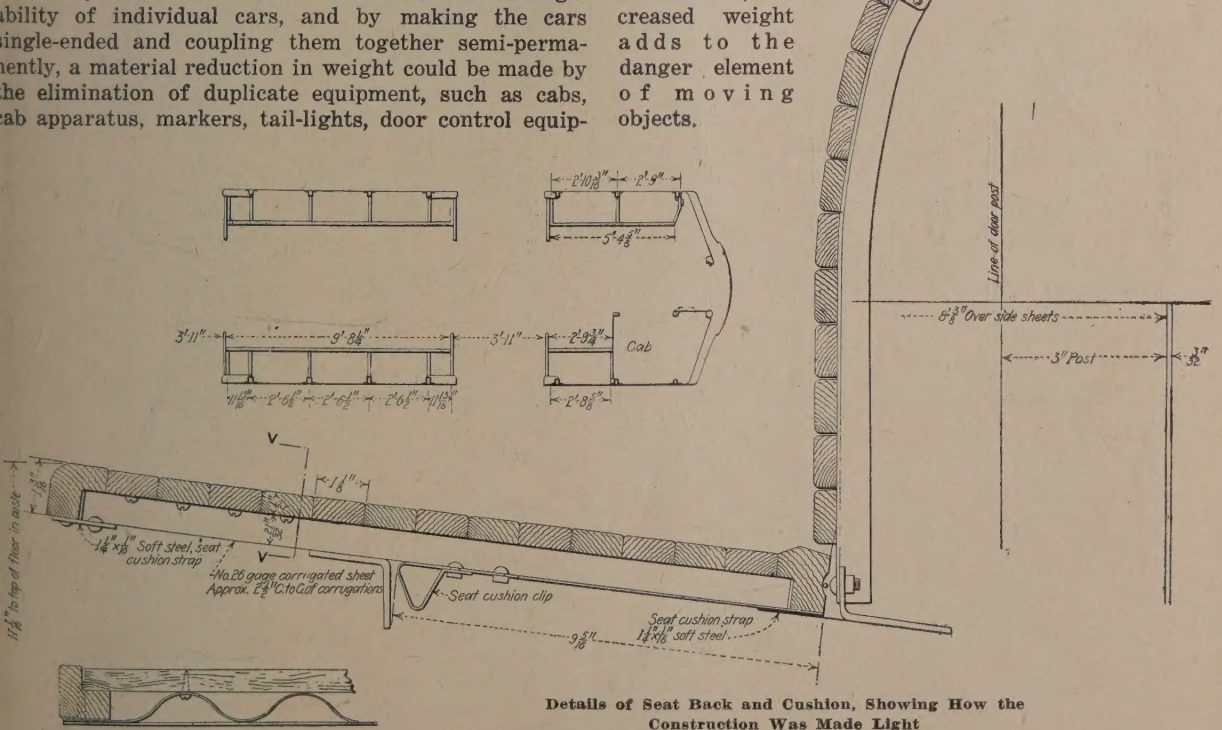
**End of a Two-Car Unit. The Inside Ends Have Semi-Permanent Coupling**

more than double itself in the total weight saving. With this in mind, we began consideration of means for reducing car-body weight without sacrificing necessary strength. We had developed the practice of operating rapid-transit cars in units of two, i.e., with one guard in control of the doors of two cars, so that adding or cutting off cars was always done in units of two. This materially reduced the value of absolute interchangeability of individual cars, and by making the cars single-ended and coupling them together semi-permanently, a material reduction in weight could be made by the elimination of duplicate equipment, such as cabs, cab apparatus, markers, tail-lights, door control equipment, etc. This amounted to approximately 1,300 lb. per car.

### Doors on the Outside of Car Reduced Weight

It had been universal practice to slide the doors, in both the sides and ends of the car, into pockets in the walls. This meant double walls, glass, etc., at all such pockets—eight per car. These pockets also determine the thickness of the car walls. By placing the side doors on the outside of the car and designing the end doors to swing, we eliminated the necessity for door pockets and were able to reduce the thickness of the walls of the car. This permitted placing the seats nearer the outside line of the car and gave the further advantage of greater passenger carrying capacity. In fact, the distance over side walls of the East Boston tunnel car is less than that of the elevated car, while the aisle space is greater; or in other words, it is a smaller car outside and a larger car inside. This change permitted a saving in weight of approximately 1,500 lb.

The matter of providing suitable fireproof doors on rapid-transit cars has been a serious problem. Sheet steel was generally adopted for this construction, but a number of difficulties developed from its use. The light-gage sheet steel at first used cracked at the corners. There was trouble from condensation of moisture in the interior of the door, and also water would get into the door at the glass rabbet. For these reasons heavier metal was substituted, and in some cases cast aluminum doors were used. Notwithstanding this, the weight and cost of the doors increased. Weight in car doors is doubly expensive. It costs money to carry it on the car and costs additional money on account of having to move that weight twice at each station stop when the door is opened and closed. As is well known, increased weight adds to the danger element of moving objects.




**Details of Seat Back and Cushion, Showing How the Construction Was Made Light**

As a remedy and a means of reducing weight, we decided to go back to the wooden door and provide fireproofing by covering the wood with thin sheet-metal. The Fire Underwriters consider a wooden firedoor covered with tin of no greater firehazard in a building than one made of sheet steel. We arranged to seal the sheet metal covering to prevent moisture from getting to the wood, and we interlocked the sheet-metal covering so that in the event of the doors being subjected to temperatures sufficiently high to melt the seal, the sheets could not be displaced. With such doors, we were able to make a reduction of 800 lb. in weight.

### FIREPROOF FLOORS OF LIGHT WEIGHT ADOPTED

The necessity of providing fireproof floors in cars was the cause of a material increase in weight. The method adopted was to lay sheet-steel flooring, pressed in the form of corrugations to give some vertical stiffness over the underframe, and cover this with a cement composition, the combination resulting in a stiff and rigid floor. This met the fireproof requirements and carried the load satisfactorily. Due to the vibrations set up in the floor, the composition material cracked and became loose. To prevent this, floors were laid with thicker composition, which meant additional weight, and there was the further objection that the floors were cold in winter. Our attention was called to a floor that had been invented by a New York engineer, which was called "Truss-plate" flooring. On investigation we found that two cars having this flooring had been in service several years with apparently satisfactory results. By the use of this material in our East Boston Tunnel cars, we were able to save approximately 2,000 lb. in weight, and the floor, being constructed with a dead air space between the upper and lower plates, seemed to be an effective temperature insulator, making the floor warmer during the cold months. The strength of th floor is entirely in the plates and a thin, flexible cor position is used for the wearing surface.

### REDUCING WEIGHT OF THE SEATS

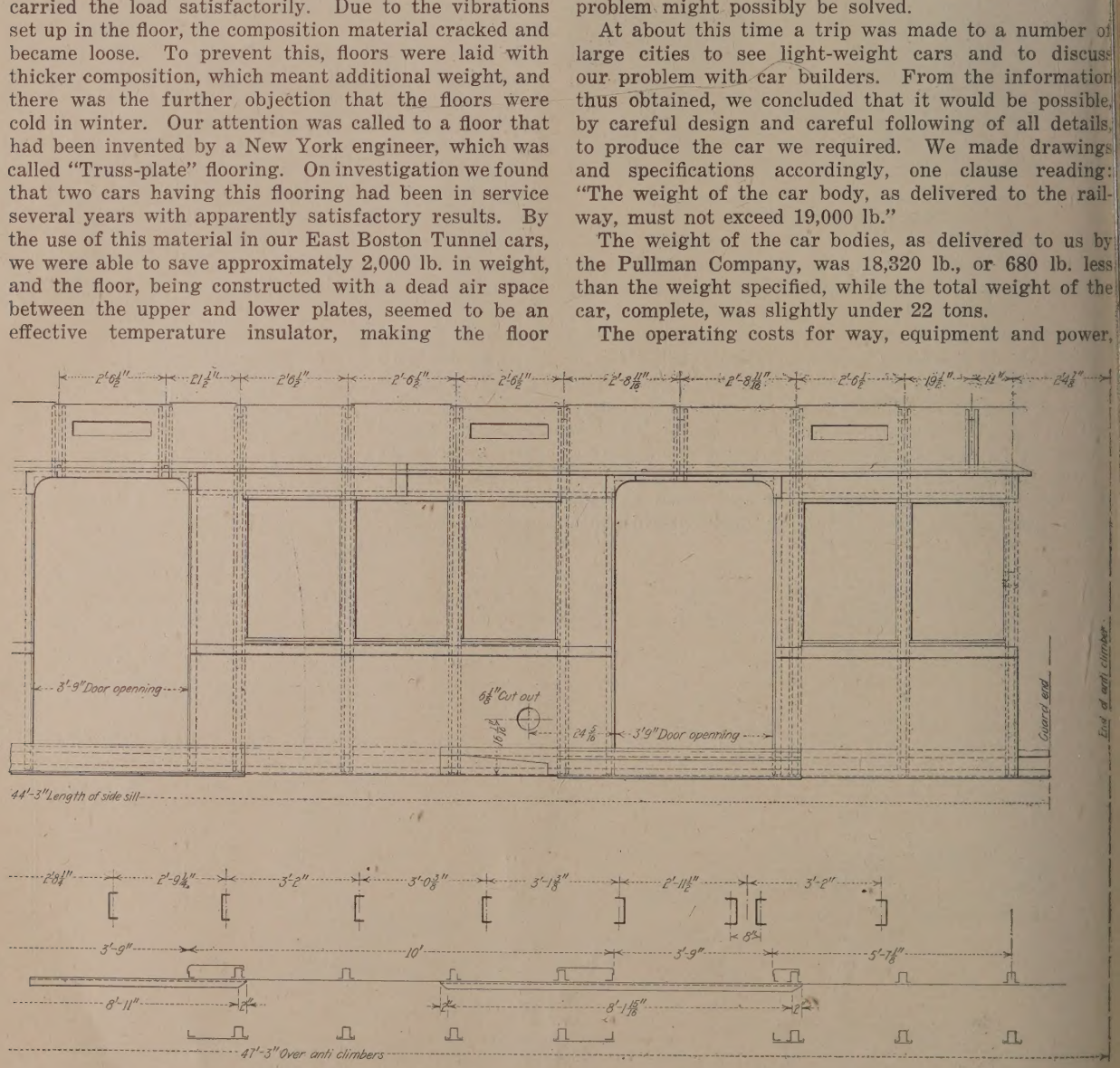
The wooden slat seats in the rapid-transit cars wer designed with the necessary strength entirely in th wood; to meet the Underwriters' requirements for fir proofing over heaters and electrical apparatus, the un dersides of seat-frames were covered with sheet meta By redesigning the seat and using the sheet metal i a corrugated form we were able to make the meta furnish the necessary strength and stiffness as well a provide the necessary fireproofing. This change enable a saving to be made in seat weights of 160 lb. per car.

The total of the items of weight saved thus fa mentioned amount to 4,460 lb. in car-body weight. A previously pointed out, weight saved in the body woul more than double in the total weight saved. This meant a total saving of approximately 5 tons. Having accomplished so much, it began to look as though the problem might possibly be solved.

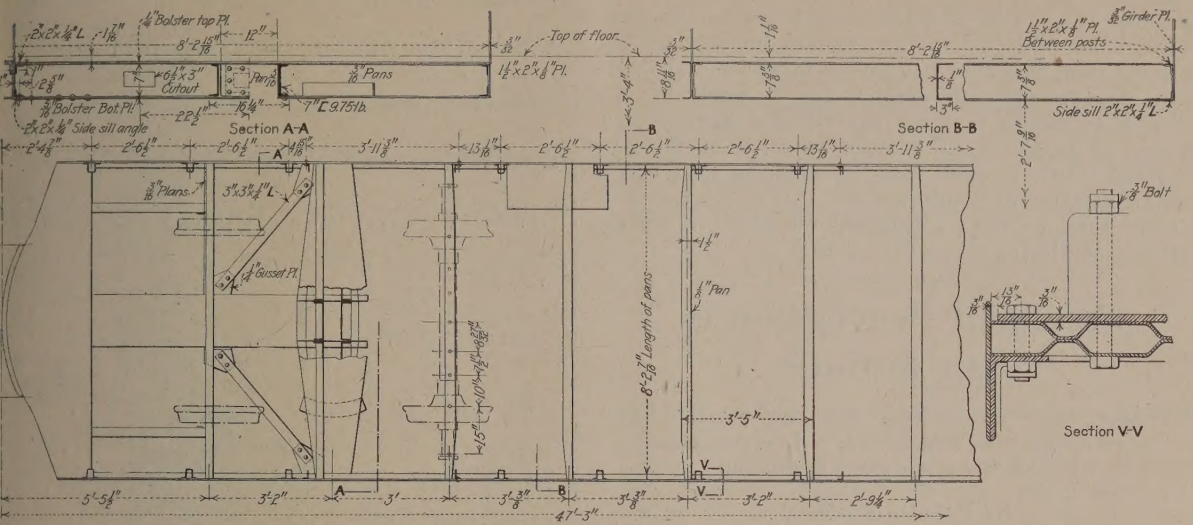
At about this time a trip was made to a number of large cities to see light-weight cars and to discuss our problem with car builders. From the information thus obtained, we concluded that it would be possible, by careful design and careful following of all details, to produce the car we required. We made drawings and specifications accordingly, one clause reading: "The weight of the car body, as delivered to the railway, must not exceed 19,000 lb."

The weight of the car bodies, as delivered to us by the Pullman Company, was 18,320 lb., or 680 lb. less than the weight specified, while the total weight of the car, complete, was slightly under 22 tons.

The operating costs for way, equipment and power,




Details of Side Framing for East Boston Tunnel Car




**The Floor Framing Shows a Light but Strong Type of Construction**

these cars in the East Boston Tunnel service, based $219 per ton per year,* will be approximately $108,000 year less than if the service were performed by s similar to those last placed in service on the vated lines.

### Electric Door Operating Mechanism Used

There are two other features of note in connection h the East Boston Tunnel car. The Boston Elevated ilway was the first to operate car doors with pneu- tic engines. The practice has now become nearly versal. It has made possible great improvement in eration and economy, but the use of compressed air that purpose has some drawbacks. In the first ce, the conversion from electrical energy to mechani- energy is accompanied by considerable loss. Com- essed air is hard to confine and to prevent from king. The leak may be small at any one point, but re are numerous points and they are not readily essible for testing or repair. This means that there a constant leakage of air as long as air pressure is the car and the compressor capacity must be pro- tioned to maintain proper pressure notwithstanding air leakage. In the case of the East Boston Tunnel , this meant that while a 16-cu.ft. compressor would ample to provide air for brakes and control, a 25-ft. mpressor would be required if air-operated doors re used. The difference in compressor weights was proximately 300 lb. These were important consider- ons, but the desirability of eliminating the troubles sticking and slow working doors in cold weather was greater importance, and if doors could be controlled rectly by electric power it seemed that the results ould be economical as well as beneficial from a service ndpoint.

We built a car door model and equipped it with an ctric motor and controlling mechanism. From the sults obtained in this way we were satisfied that the eme was practical. We issued specifications for electric or mechanism and the Consolidated Car Heating Com- ny was the successful bidder. Our experience, so far, th the electric door operators indicates that they will an improvement over the pneumatic door operators.

*The derivation of this figure was given in an article in ELEC- C RAILWAY JOURNAL for July 26, 1924, page 122.

The introduction of light-weight cars of large carrying capacity introduced another problem, that of braking. The usual practice has been to adjust the braking pressure to the light weight of the car so as to reduce the liability of wheel skidding. This trouble is not only disastrous to the wheels but it is a well-known fact that sliding friction between wheel and rail is considerably less than rolling friction. For that reason a longer distance is required to stop a car when the wheels skid. This means that with the brake pressure adjusted to the weight of the car without load, there was no means provided for taking advantage of the additional friction or adhesion between wheel and rail due to the additional weight of the passenger load. This necessarily meant longer stopping distances even with maximum braking conditions, as the load was increased. With our steel elevated cars, the maximum passenger load amounts to 33 per cent of the dead car weight, which is not such a serious difference, but with the East Boston Tunnel car the proportion of passenger load to dead weight is 57 per cent and in the interests of safety and traffic capacity, this factor could no longer be ignored.

We had reached a point where some means must be applied for increasing the available braking pressure as the load was increased and conversely reducing that pressure as the load was decreased. Such a device was in use on the New York Municipal subway lines. On investigation, it was found to work very satisfactorily, but the design was such that it required considerable space for installation which could not be provided on our cars, and its weight amounted to 2,000 lb., which we could not afford. However, designs were submitted by the manufacturers showing a device which would accomplish practically all that the Brooklyn device accomplished; which could be installed in the space available and which weighed only 165 lb. This was adopted for both the No. 5 semi-convertible cars and the East Boston Tunnel cars. These brakes are operating very satisfactorily and seem to meet the conditions fully. It is possible to stop a loaded car in the same distance as that in which the empty car can be stopped. This should make for greater safety and materially add to traffic capacity on lines of dense traffic.

If the East Boston Tunnel cars were to be inter-

changed or operated with the present elevated cars and were to be subjected to the stresses imposed by the heavier cars, it would have been impossible to make any such reduction in weight; i.e., it would be impossible to design cars for our elevated lines with a weight of 44,000 lb. It may, however, be possible in building future elevated cars, by adopting some or all of the new features incorporated in the East Boston Tunnel cars, to make a material reduction in weight without sacrificing strength.

# Accident Prevention in San Antonio

### A Feature Is the Use of Home-Made Bulletins, as They Give a Personal Touch—Their Use Has Been Followed by Accident Reduction

BY HAROLD A. BRIGGS
Safety Supervisor San Antonio Public Service Company

WE BEGAN a special effort in accident prevention on the San Antonio traction system in November, 1923. The first two months were spent in reconnaissance and in forming an estimate of the situation.

In January, 1924, we began making a thorough investigation of every accident in which there was any doubt as to how it happened. We classified the responsibility for accidents into four classes, as follows, (1) trainman at fault; (2) trainman not at fault but the accident might have been avoided; (3) the other party at fault, no chance to avoid it; (4) company at fault.

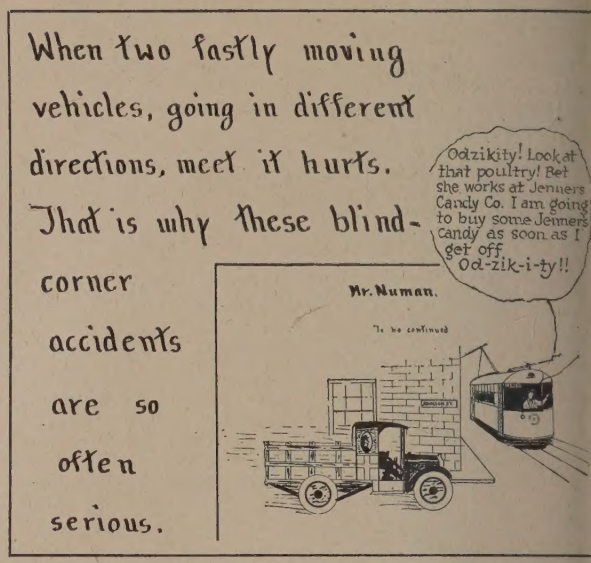
We also classified the accidents according to cause, such as "Following traffic too closely," "Too fast at intersections," "Inattention to duty," etc. With this information before us it was comparatively easy to lay our plans.

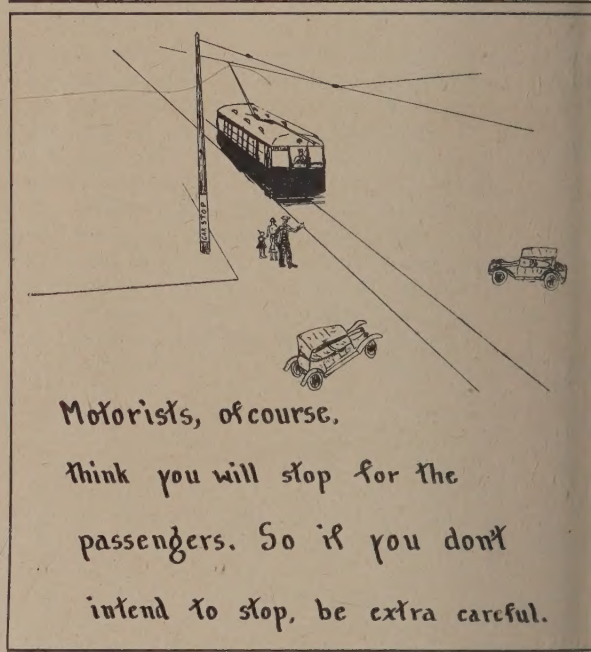
Believing that generally a man will do what is right if he knows what right is, we centered our efforts on showing the trainmen what it was safe to do and what was unsafe. A special study was also made of equipment, track, schedules in use, etc., with a view of making it easy for the man to do the right thing.

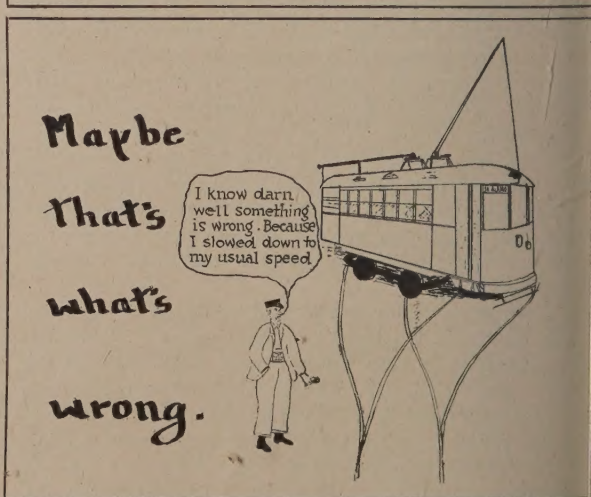
Our educational work has been carried out through personal instruction by line inspectors and by safety bulletins. The line inspectors who are daily in close personal touch with the men are kept advised of the accident situation by letter or information daily through the chief inspector.

When a man is found doing something wrong he is instructed on how to correct his trouble. After a few days and for some time afterward he is closely watched to see if he is following instructions. In most cases it is found that after the second warning or caution about a particular condition or habit, the man makes a strong effort to follow instructions. However, it has been necessary, in a very few cases, to let men out of the service because they could not, or would not, obey the rules.

Another feature of our educational plans that deserves special mention is our home-made safety bulletins. One great objection to the general safety bulletin is that it lacks the local and personal touch to make it attractive. And they so seldom fit the conditions that the company is especially fighting. Then again, a majority of those who do read them don't get the benefit they should out of them, because they think


When two fastly moving vehicles, going in different directions, meet it hurts. That is why these blind-corner accidents are so often serious.
Odzikity! Look at that poultry! Bet she works at Jenners Candy Co. I am going to buy some Jenners candy as soon as I get off. Od-zik-i-ty!!
Mr. Numan.




These Home-Made Bulletins Pictured Local Conditions and Were Effective

What does that bird in New York know about conitions here?"

We have been creating our own bulletins, and by sing them in conjunction with personal drives by the ne inspectors on the same subject have produced good esults.

The first poster reproduced shows the dangers of nattention at blind corners, and at Johnson Street in articular. Johnson Street has been the scene of the rst of a series of cartoons we called "Mr. Numan," howing some of the predicaments encountered by a ew man.

The second poster is of more general interest and as drawn and put on our board the day after one f the men had demolished an automobile because of oing the very thing depicted in the poster.

The third poster was put out on the day after a ne-man car had derailed his car by hitting a switch oo hard.

The trainmen are beginning to look upon all of the osters now as true pictures of something which has appened, and the first question they ask is "Who did it?" This information soon leaks out and creates a great deal of friendly ridicule and good advertising of the cause of the accident.

These home-made bulletins are drawn to fit local situations and have been found effective at a time when the line inspectors are making a personal drive outside against the same conditions. Especially good results have been obtained.

In January, 1924, our classification showed 33 accidents that were the fault of the trainmen and 52 others that ought to have been avoided. In June the record shows 8 that were the fault of the trainmen and 37 others that ought to have been avoided. This makes a total of 45 in June against 85 in January that ought to have been avoided. Lest some of this gain should be credited to an improvement in the traffic conditions it should be explained that in January 60 automobiles hit street cars, and in June, 92.

There was also a good showing compared with last year. In June, 1923, we went 1,800 miles to an accident of the collision type. In June, 1924, the figures was 2,500 miles per accident.

# Dispatching Helps Maintain Good Service

**In Denver the Cars Are Operated on Regular Schedules Except When Unusual Conditions Require Special Orders from Dispatcher—System of Peak Load Reports by Telephone Gives Running Record of Loading and Keeps Each Crew in Touch with the Office**

CONTROL of car movements by a central dispatcher is combined with regularly scheduled operation under normal conditions on the Denver Tramway Company's lines. In this way the minimum mount of supervision is required to handle the service vhen things are running smoothly, and at the same ime any line on which abnormal conditions occur may e taken over quickly by the dispatcher and an emerency schedule operated under his direct supervision ntil normal service is re-established. With the comined system that is used, the cars run on time cards or the full 18-hour period, but if for any reason the ervice becomes irregular, the dispatcher immediately akes over the line, straightens it out and then puts it ack on time-card operation.

### Maximum Passenger Loads Reported by Telephone

In combination with the dispatching arrangement, a ystem of peak load reporting by telephone serves the louble purpose of putting each car in touch with he dispatcher's office at the end of each trip and at he same time furnishes a complete record of the loading n each line, so that additional service may be added n very short notice to handle unusual loads. At the nd of every trip the trainmen report from telephones nstalled at the ends of all lines to special peak load perators stationed at a central telephone switchboard. These reports give the number of passengers on the ar at the peak load point on the line. If the dispatcher s operating the line or desires to issue special instrucions, the trainman is switched to the dispatcher's oard. Otherwise, the train crew receives an "O. K." rom the peak load operator and continues to run on the egular time card for his run.

The dispatcher is not merely a trouble man to take records of accidents and car defects, but spaces cars to take care of any unusual condition and is responsible to a large extent for the regular operation of all cars. It is evident that the system used gives a running check on the operation and loading of every car in service. This is obtained up to 11:30 p.m.

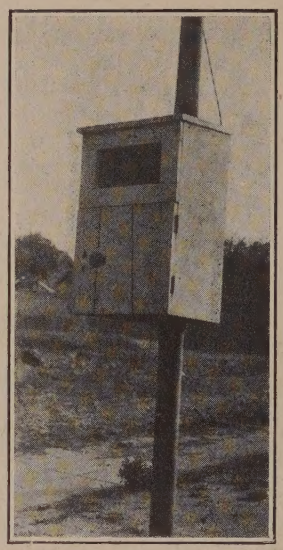
Peak load reports coming in from the trainmen are listed on special 5-in. x 8-in. cards in a visible "Kardex" file, so that a comparison for any number of days can be made readily for each run and trip. Separate records are kept for weekdays, Saturdays and Sundays. This record is carefully inspected each day for any unusual conditions. If a car was late during a trip and was overloaded on this account the fact is apparent from the record.

Each section of the Kardex frame in which the cards are filed corresponds to a certain group of runs on a given division of the system. These all terminate at points connected with a certain section of the switchboard assigned to one operator. Each tray of cards includes all the runs on these lines for a certain period of the day. Thus during a certain period all the reports coming in to a given section of the switchboard will be covered by the cards in certain groups of trays.

The cards are filed in the trays by lines, which makes it possible to locate the proper card promptly when a trainman reports over the telephone. The cards are made out in advance, each one containing space for the record of an entire week for a given run. This includes the leaving time from terminals, both inbound and outbound. When a trainman makes a report by telephone, he states to the operator the line on which he is operating the time he left the terminal and the number of passengers on his car at the peak load point, both inbound and outbound. The operator locates the proper

card for the line and then finds the leaving time indicated. This is facilitated by having the cards arranged consecutively in the file trays according to the terminal leaving times throughout the day.

As the peak load for each run is reported in, consecutive runs on each line show up in comparison with each other in the record, and unusual load conditions are at once noticed. When a car gets off its proper schedule the actual leaving time at terminals is recorded on the card by the operator and shows in comparison with the scheduled leaving time.



Telephones Located Near the Ends of All Lines Are Connected Directly with the Peak-Load Operators in the Dispatcher's Office

In drawing up a new schedule for any line the peak load cards are used as a guide. The reported loading is averaged for a predetermined period, so as to give the average peak condition for the various trips. The number of cars needed on each line for any given period is thus readily determined. In general, a load of 70 passengers on a two-man car at the peak point on the line becomes the basis for added service in the rush hour. In the non-rush period a seated load is the basis for determining the number of cars required, but on most lines, in order to hold the headway down so as to give maximum practicable frequency of service, the headway, and not the loading, becomes the basis for fixing the number of cars on the line.

## Each Trainman Carries All Schedules for His Line

Schedules are first made up graphically. This shows at a glance the amount of dead time or layover at the terminals. With the schedule thus drawn up, the leaving time for each car is taken off and compiled in time-card form, with cars in service for the entire day shown for the full 18 hours. Extra cars to take care of the peak periods are shown in the same way. From these time-cards the runs are made up and the assignments are then distributed to the divisions for voting by trainmen. Time cards are printed and issued to trainmen. Each man on a given line is supplied with a book containing the time card for each run on the line he is working, as well as his own. Thus the trainman has all the time cards on his line, so that if the dispatcher switches him to another run he will have all the necessary schedule information. When placed on a run different from his regular assignment, a trainman continues to operate on it for that day, or until again changed by the dispatcher. The weekday schedules are printed on white paper, the Saturday schedule on green and the Sunday schedule on pink. The sheets are 2¾ in. x 6¾ in. As all the schedules for each line are included, there is one complete book outstanding for each car on a given line.

SCHEDULE NO. 10 COLFAX RUNNING TIME EFFECTIVE SEPT. 3, 1923. (Corrected to Sept.17,1923)

| | (a) | (b) | (c) | (e) | (f) | (g) |
|---|---|---|---|---|---|---|
| From Birch | | | | | | |
| To Detroit | 4 | 4 | 4½ | 5 | 4 | 5 |
| Williams | 2 - 6 | 2 - 6 | 2½- 7 | 3 - 8 | 2½- 6½ | 2½- 7½ |
| Emerson | 2½- 8½ | 3 - 9 | 3 -10 | 3½-11½ | 3 - 9½ | 3½-11 |
| Broadway | 2½-11 | 3 -12 | 3 -13 | 3½-15 | 2½-12 | 3 -14 |
| Stout St. | 3½-14½ | 3½-15½ | 3½-16½ | 3½-18½ | 3½-15½ | 3½-17½ |
| Loop | 2½-17 | 2½-18 | 2½-19 | 2½-21 | 2½-18 | 2½-20 |
| From Loop | | | | | | |
| To Broadway | 6 | 6 | 6 | 6 | 6 | 6 |
| Williams | 5 -11 | 5½-11½ | 6 -12 | 6½-12½ | 5 -11 | 6½-14½ |
| Birch | 7 -18 | 7½-19 | 8 -20 | 9½-22 | 7½-18½ | 10½-25 |
| Report | 1 -19 | 1 -20 | 1 -21 | 1 -23 | 1 -19½ | 1 -26 |

A Sheet Is Included in Each Schedule Book, Showing the Running Time Between Important Time Points for Various Periods of the Day. The Dispatcher Specifies the Running Time to Be Used When Cars Are Not Operating on Schedules

In making up schedule books for the trainmen the regular men are furnished with books containing the schedules for the runs on one line only. The extra men in each division, however, carry books containing the schedules for all the lines operating out of the division to which they are assigned.

In addition to the regular schedules for the various runs, each trainman's book contains a sheet which gives the running time between the various time points at different hours of the day, as the running time allowance is varied to allow for differences in street congestion and amount of passenger load and interchanges. These various sets of running times for each line are indicated by letters, as (a), (b), (c), (d), as shown in an accompanying illustration. A sheet of this kind accompanies the group of run schedules for each line, so that the extra men are supplied with a running time slip for each line in their schedule books.

SCHEDULE NO. 10 WEEK DAY
COLFAX
EFFECTIVE SEPTEMBER 3, 1923.
(Corrected to March 3, 1924)
RUNS NUMBER 30 AND 39
LEAVE HOUSE AT 7:24 A.M.

| Lv. Birch | Lv. Loop |
|---|---|
| | P(e) 7:27 |
| 7:51 | D(c) 8:12 |
| (e) 8:34 | *(b) 8:56 |
| 9:16½ | 9:34½ |
| 9:54½ | 10:12½ |
| 10:32½ | 10:50½ |
| (e)11:12 | (c)11:33 |
| 11:54 | 12:13 |
| 12:34 | 12:53 |
| 1:14 | 1:33 |
| 1:54 | 2:13 |
| 2:54 | 2:53 |
| 3:14 | R 3:33 |
| (z) 3:55½ | P 4:15½ |
| (c) 4:41½ | (g) 5:00½ |
| (c) 5:28 | (g) 5:47 |
| 6:16 | D(c) 6:06 |
| 6:58 | 7:17 |
| 7:38 | **(f) 8:00 |
| 8:19½ | 8:37½ |
| 8:57 | 9:15 |
| 9:34½ | 9:52½ |
| 10:12 | 10:30 |
| 10:49½ | 11:07½ |
| 11:27 To House | |

In House at 11:49 P.M.
* 1 minute lay-over in Loop this trip.
** 3 minute lay-over in Loop this trip.
"R" Relief at 3:33 P.M.

Each Trainman Is Furnished with Book Containing All Schedules for His Line. Weekday Schedules Are Printed on White Paper, While Saturday and Sunday Schedules Are Distinguished by Colors

When the dispatcher takes over a line in an emergency he instructs each man reporting by telephone to leave at a certain time, using running time (a), (b), (c), etc., as shown by the time card, until receiving further instructions. The line continues to operate on such telephone orders until all cars have been properly spaced, even though not in their regular locations. When this is accomplished, the dispatcher orders each man reporting to take the scheduled run corresponding with his position at the time of reporting. Each crew then continues to operate for the rest of the day on the assigned run, using the schedule given for that run in the schedule book.

Two factors make this method of dispatching cars practicable for the conditions in Denver. In the first place men are paid for straight time only, so that in the event of extra time because of change in the run to which a man is assigned, the operating cost is not thereby increased by the payment of a higher rate for overtime. In the second place, it has been found that the saving in the number of street supervisors

equired under the system of telephone dispatching elps to pay the cost of the telephone system and the perators required in connection with it.

### USE INDEPENDENT TELEPHONE SYSTEM

A special telephone system forms the means for arrying out this arrangement. The system was installed and is maintained by the telephone company s an independent telephone service on a rental basis. 'his includes telephone stations wired directly to the ispatcher's office from the terminals of all car lines. 'hese terminal telephones include a total of approximately 90 stations wired directly to the dispatcher's ffice. In addition there are a number of stations in he central business district which may be reached by rainmen or supervisors.

An accompanying illustration shows the arrangement f the telephone switchboard room in the dispatcher's

**Peak Load Operators Receive Reports from Trainmen Each Trip. Dispatcher Takes Charge of Line When Unusual Conditions Occur**

ffice. The main peak load report boards are divided nto four independent sections connected directly with he stations at the terminals out on the line. In this way the four peak-load operators work independently and communicate directly with the trainmen making reports, without any other switching operations. The dispatcher has a master board, to which any terminal elephone can be connected by means of a simple switchng operation by the peak-load operator. Thus, when he dispatcher is operating a line, the particular peakoad operator assigned to that section connects incoming alls to his master board, so that the trainmen receive running instructions directly from the dispatcher. The tation is also equipped with a P.B.X. exchange, so that onnection may be made with any city telephone through he telephone company's exchanges.

Each peak-load report board assigned to an individual elephone operator has a maximum capacity of approximately 5 calls per minute. This fixes a maximum per perator of about 300 calls from cars per hour.

# Compiling Individual Car Mileage in Detroit

**Allocation of Car-Miles and Ton-Miles, Made Obligatory by Interurban-City Arbitration, Is Made by Use of Special Record Forms and a Powers Tabulating Machine—The Sorting and Printing Are Done Automatically**

BY I. N. MERRITT
General Auditor Department of Street Railways, Detroit, Mich.

COMPILATION of individual car-miles by the Department of Street Railways, City of Detroit, was made mandatory by the award of the board of arbitration in connection with the determination of a rate that the department should receive as rental for use of its track for the interurban operation of the Detroit United Railway. Parts of the award dictate a ton-mile rate, while others are on the basis of a straight car-mile division of cost. It was described in considerable detail in ELECTRIC RAILWAY JOURNAL for Jan. 12, 1924, page 67.

A number of systems were experimented with, resulting in the adoption of the method now in use. The Detroit street railway system embraces approximately 375 miles of single track spread over an area of 90 sq.m. The 2,000 cars, including interurban, service, etc., operate monthly 4,525,000 car-miles divided as follows:

| | |
|---|---|
| City passenger car-miles | 4,300,000 |
| Service car-miles | 17,000 |
| Interurban car-miles (D. U. R.) | 200,000 |
| Dead mileage | 8,000 |
| Total monthly car-miles operated on D. S. R. system | 4,525,000 |

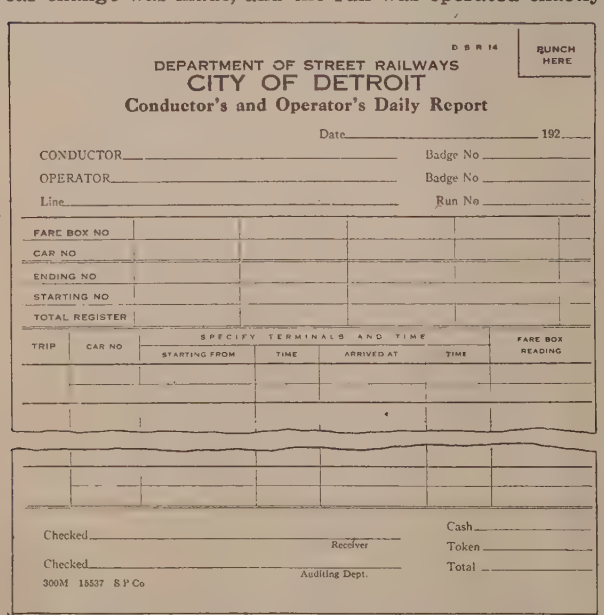
The division of the mileage into classes "A," "D." and "D.U.R.," depending on the type of track and cars,

agreed to in the arbitration, is necessary to apportion the rental rate for interurbans, which is arrived at by knowing the combined total of all miles operated over the entire system, the rate being different for the different classes. The system invoked to accomplish this is unique in its simplicity and lack of forms required and it is believed, reduces to a minimum the functions necessary to obtain the final result.

The original information is taken from the conductors' daily trip sheets, the face of which is reproduced herewith. The back contains information on fares and transfers. Space is provided for listing terminal time of arrival and departure, time points and terminal time, car numbers, run numbers, number of trips, etc. In case there is any deviation from the schedules the conductor or operator is required to place an X opposite the part of the trip affected. At the completion of the day's work the operator or conductor turns in the trip sheet, which is checked by the station master to ascertain that he has received a trip sheet for each car or run dispatched and that they are properly filled out and contain all the required information. Then they are forwarded to the auditing division where the mileage is computed.

The schedule makers supply the auditing division with a draft of each schedule. The trip sheets when received are first checked again to see that each line or division is complete, by comparing them with the schedules and the report of schedule deviation forwarded each day from the stations. They are then segregated into groups or divisions, and four comptometer operators compute the mileage from the trips as shown. These operators are furnished with summaries of each schedule showing the starting and ending time and amount of mileage (divided into the various classes) for each run or section of run. The operators also have charts showing the distances between the various terminals of the several lines which they handle.

The mileage which each car has accrued is then entered in colored pencil on the trip report. Where no car change was made, and the run was operated exactly


D S R 14

PUNCH HERE

DEPARTMENT OF STREET RAILWAYS

CITY OF DETROIT

Conductor's and Operator's Daily Report

Date _____ 192__

CONDUCTOR _____ Badge No _____

OPERATOR _____ Badge No _____

Line _____ Run No _____

FARE BOX NO

CAR NO

ENDING NO

STARTING NO

TOTAL REGISTER

| TRIP | CAR NO | SPECIFY TERMINALS AND TIME | | | | FARE BOX READING |
|---|---|---|---|---|---|---|
| | | STARTING FROM | TIME | ARRIVED AT | TIME | |
| | | | | | | |
| | | | | | | |

Checked _____ Receiver

Checked _____ Auditing Dept.

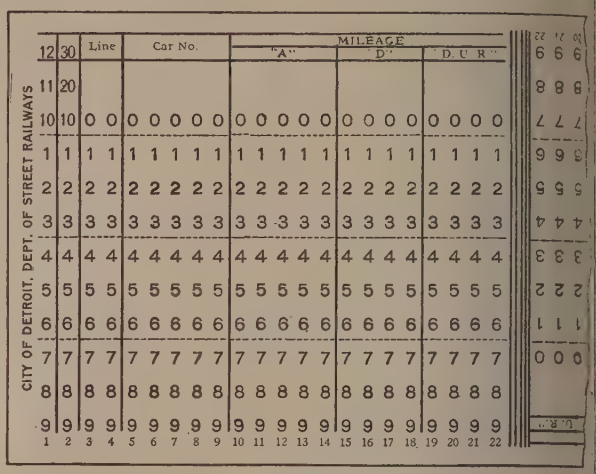
Cash _____

Token _____

Total _____

300M 15537 S P Co

**Face of Trip Sheet, Showing Trip Information from Which Mileage Is Computed. The Reverse Side Contains Report of Fares and Transfers**




**Half of the Punch Card for Tabulation. The Other Half Is a Duplicate, so that the Card Can Be Used Twice**

as scheduled, no computation is necessary, the mileage merely being posted as shown upon the schedule summary. In the event of car changes or omitted or additional service, which number about 50 per cent of the total reports, the mileage is computed according to individual trips.

The balance of the segregating and listing of the mileage is accomplished by means of Powers automatic tabulating machines. Two punch machine operators perforate the cards, showing the date, car number, line number, and number of miles operated by the various classes. After punching, the cards are run through the tabulating machine, which prints a list of the daily mileage for each car according to lines and classes for preparation of the daily operating reports. The cards are then filed until the entire month is completed, after which they are sorted by the sorting machine according to car numbers, subsequently being run through the tabulating machine for listing of the month's miles operated by individual cars by classes of mileage. The two punch operators also handle all of the machine work.

The interurban mileage operated over city tracks is computed and tabulated in the same manner from trip reports furnished from the various interurban divisions. This operation requires one additional comptometer operator.

Every movement of a car is reported on some form of trip sheet. Approximately 2,500 are received daily from revenue, non-revenue, and service cars of the department, and approximately 400 from interurban cars. Each comptometer operater handles approximately 600 trip sheets per day. There are approximately 4,500 cards punched each day. The system contemplates the completion each night of the previous day's operations and in the first six days of the month the completion of the previous month's work by individual car-miles. The ton-miles are obtained simply by multiplying the total miles operated by the tare weight of the car in each case.

The individual car-mile record is transmitted to the maintenance divisions at the end of each month for use in connection with the maintenance of the rolling stock and for statistical information in general.

Although the system is a result of many nondescript experiments and was adopted to solve the compiling of individual car-miles, it has proved more than satisfactory, and beyond question, would be continued for this purpose even though the necessity of obtaining this record for segregating interurban costs were abandoned.

# Rear-Entrance, Front-Exit, One-Man Car in Toledo

## n of These Double-Truck Cars Are Without Turnstiles on a Belt Line—No Difficulty Has Been Found with Loss of Fares

INCE May 4 Toledo has been operating double- truck one-man cars on the Bancroft belt line of that ty. Ten cars have been rearranged for this purpose it six supply the basic service, two more are used aring the rush hours and two are kept as reserve. hese cars have given such satisfaction that within the st few weeks the company has decided to use the same pe of rolling stock on about one-third of the lines in oledo. Plans are being made to make ver enough other cars to supply this ervice. The especially novel feature f these cars is that they are rear-entrance, front exit, pay-as-you-leave and ave no turnstile. The operator can keep the rear entrance under close inspection while the rear door is open and does so to watch boarding passengers. He would be practically helpless, however, to stop any passenger getting off the rear platform without paying his fare. In fact, his instructions require him simply to report cases of this kind and not try to stop them. Up to this time the company has not suffered any loss in this way.

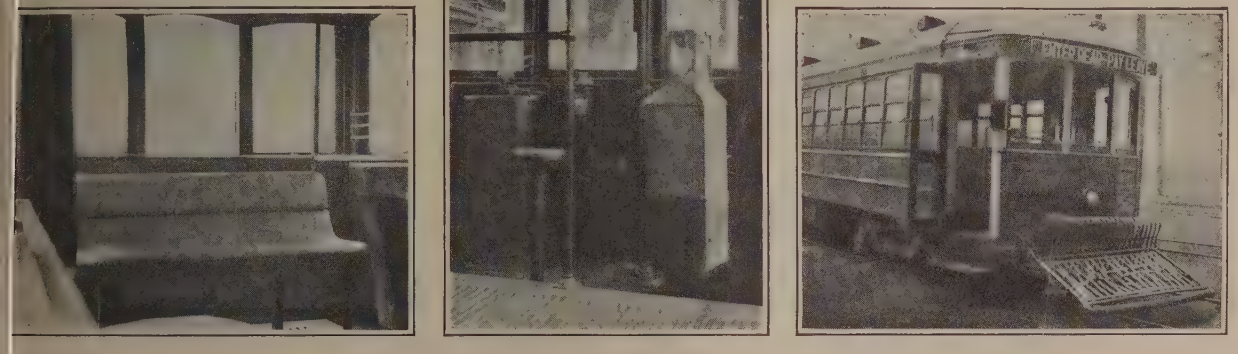
This is the second attempt of the Community Traction Company of Toledo to operate one-man cars. A previous effort in November, 1922, was stopped by order of the Council on the ground that it was not permitted under the present franchise. While there has been a growing public sentiment favoring one-man cars, the city's legal department has been asked by the Council to ascertain the legal status of the cars.

The Bancroft belt line operates through a territory quite densely populated but one that has lost considerable traffic during recent years through the widespread use of private automobiles. There is not so heavy a rush-hour traffic on this line as on some of the radial lines or those which pass through the factory districts. Most of the rush-hour traffic on the Bancroft belt line is transfer business and shoppers returning from the downtown section.

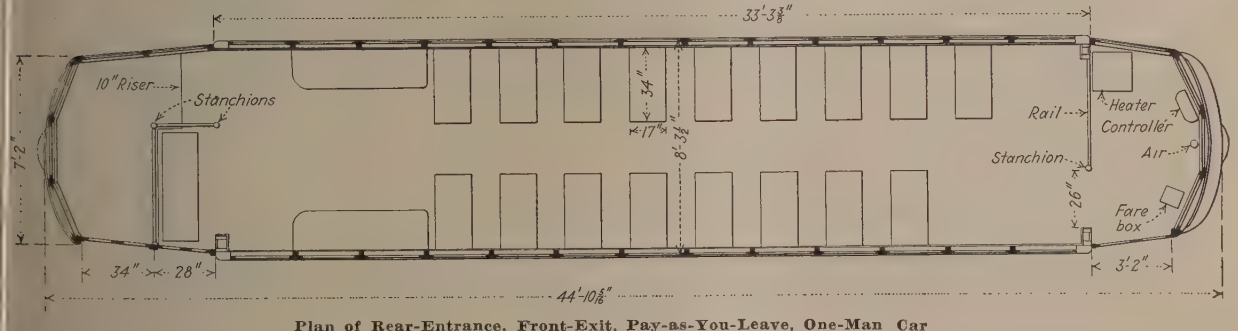
A plan of the car used, with two interior views are presented. Originally the car was a single-end rear-entrance front-exit car, with a 6-ft. 7-in. rear platform equipped with two doors. From this platform there was a 10-in. riser to the car floor. In the change to one-man design one of the rear-entrance doors has been closed up and the car floor extended back to allow room for a seat for three passengers. By these changes the passenger capacity in seats has been decreased from 47 to 45.

The car is equipped with the devices of the Safety Car Devices Company, and the single rear door is air operated by a selective control which permits the motorman to open and close either door or both by different movements of the same lever. The cars are fitted with Westinghouse 310C motors, air brakes and K36 control. They were built originally by the McGuire-Cummings Manufacturing Company and are heated with hot air.

A ceiling sign within the car reads: "Please move as far forward as possible, leave by front door, pay as you leave—Exact fares will speed up service." A sign on the outside of the car reads: "Enter rear—Pay as you leave." The fares charged are: cash—8 cents; four tickets for 25 cents; children (8 years and under) 1 cent; children (in arms) free; transfer 1 cent. A self-registering farebox is used, the transfers being collected and registered separately by the operator by means of a pedal.



Rear and Front Platforms and Front View of One-Man Car




Plan of Rear-Entrance, Front-Exit, Pay-as-You-Leave, One-Man Car

# Association News & Discussions

## Tests for Motormen and Bus Drivers*

### A Number of Psycho-technical Tests for Platform Employees Have Been Used in Paris for Some Time—They Have Now Reached a Point Where the Laboratory Is Correct in from 80 to 90 per Cent of the Cases—This Means a Large Monetary Saving

By L. BACQUEYRISSE
General Manager in Charge of Operation Paris Transportation Company

FOR many years scientific principles have been applied to the examination of applicants for street railway service. On the larger systems this subject is becoming of constantly more importance, partly because of the increasing cost of accidents caused by incapacity of the personnel and partly because a great number of (French) undertakings pay their men during periods of illness.

#### AGE LIMIT

Replies to the data sheet from thirty-seven members of the association show that all have minimum and maximum age limits. Shortage of men during the World War led, in the case of conductors, to an 18-year minimum limit in ten cases and a 17-year limit in two. With twenty-one companies the age limit is from 20 to 22. Copenhagen sets the minimum as high as 25 years and Amsterdam at 23. Very young men are not considered sufficiently serious or steady.

The maximum age limit is usually between 30 and 35 years, but in some instances this has been raised to 40 years for war veterans.

In the case of motormen and omnibus drivers, or chauffeurs, eleven railway systems reported that men under 21 years of age were accepted, while the remaining twenty-six set 21 years as the minimum. The maximum age varies usually between 30 and 35 years, partly to insure suppleness of mind and partly (as with conductors) to insure a suitable number of years employment in connection with pension regulations. The tendency is toward men of 21 years minimum who have served their time in the army and attained the desired stability of character. Statistics have also shown that the very young men as drivers are inclined to the recklessness that causes accidents. This is indicated in an analysis of the accidents on the Paris Tramway-Bus system for which motormen or bus drivers were responsible, occurring during the months of January, 1921, April, 1922, and October, 1923. The tramway and bus accidents have been tabulated separately on two bases. In one the accidents were grouped according to the ages of the motormen or bus drivers involved. In the other there was a similar grouping according to the years of service of these employees. The results are shown in Fig. 1. They embody (for the October, 1923, period) the records of 3,611 motormen and 2,037 bus drivers. For the earlier periods the numbers of each class were somewhat less.

The graphs based on the age of the men show a gradual decrease of accidents with advancing years, but with a turn for the worse among the men mor than 50 years old. These difference are more sharply accentuated in moto omnibus operation which is conducte under conditions of maximum conges tion. The graphs based upon years o service also show a much greater pro portion of accidents from beginners.

#### CONDITIONS AS AFFECTED BY SEX

Preceding the World War the plat form employees consisted of men only The war, of course, led to the employ ment of female car operators in larg numbers. No choice could be exercise at the time, owing to the fact tha women were also being drawn into s many other man-short industries. I is therefore impossible to make a comparison that would be fair to the women. It is to their credit, however, that female drivers for cars and buses, who usually had served previously as conductors, did not tend to show a greater proportion of accidents than male operators. As demobilization proceeded, almost all of the front-platform jobs were vacated. There are still many female conductors, but they are bound to go sooner or later.

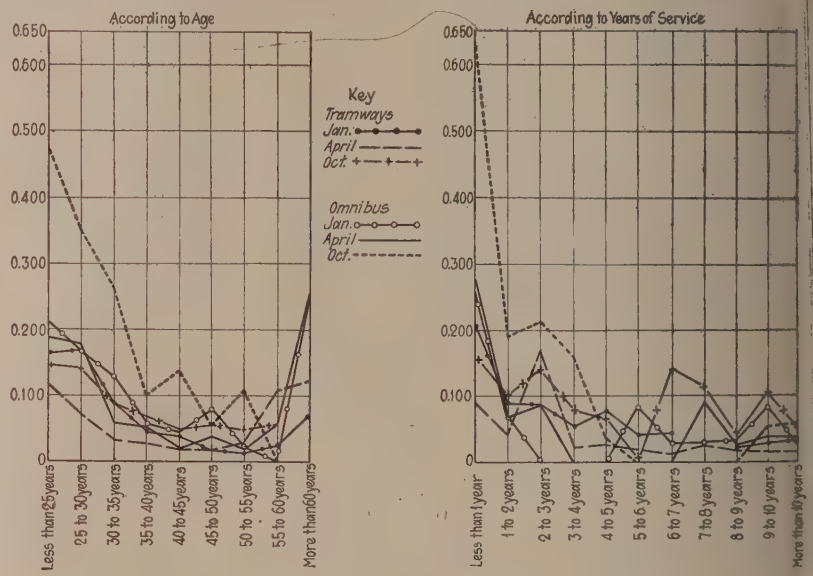



Fig. 1—Average Monthly Accidents per Vehicle Operator, Paris

#### EMPLOYMENT CONDITIONS AS AFFECTED BY PHYSICAL CONDITION

All companies replying said that they insist upon a medical examination. On small properties the examination is conducted at the office of a responsible physician who certifies whether the applicant for employment appears fit for platform service. Larger systems usually have their own medical examinations, supplemented by laboratories.

**Annual Convention and Exhibits**

*A. E. R. A.*
*Atlantic City, N. J.*

**October 6, 7, 8, 9, 10**

*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

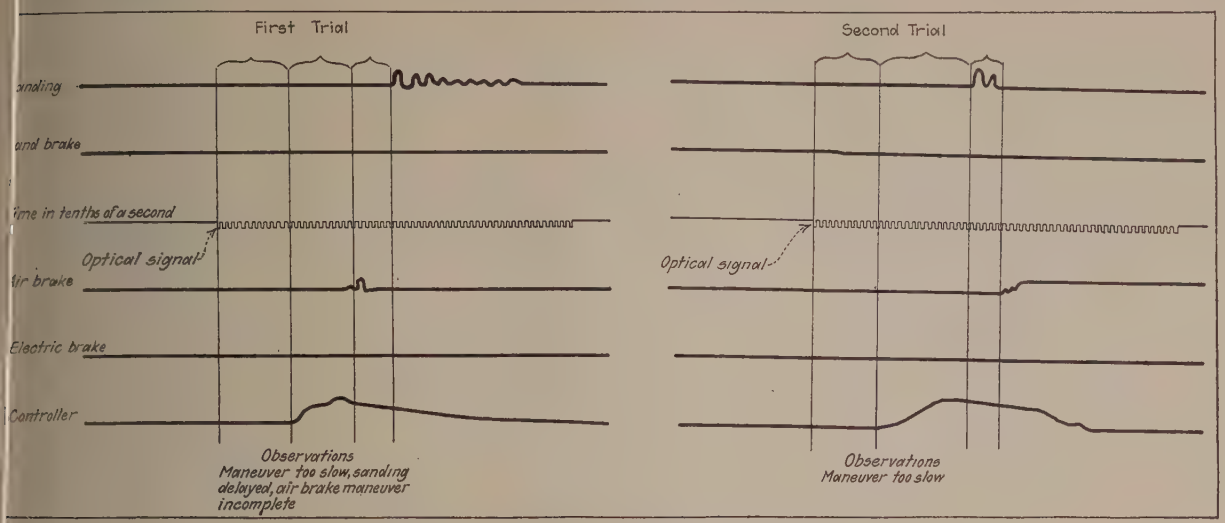



**Fig. 2—Graphic Record of Platform Tests, Brussells**

Since the applicant may be employed either on the front or rear platform, the examination covers the qualities required in both jobs. The tests appear to be severe, judging by the variety of questions and examinations, including urine analysis. In doubtful cases blood pressure is measured and use is also made of the Bordet-Wasserman reaction to determine incipient syphilis. A few systems also call for trials of muscular strength.

Where it is clearly understood that an applicant will be employed specifically as motorman or conductor, less onerous eyesight conditions are set for the conductor candidates. For instance, motormen (with rare exceptions) must have good vision without glasses, whereas the use of glasses is no bar to the conductor. There are also certain tolerances for conductors in the tests on sharpness of vision based on Monnoyer's scale. Red, green and yellow are employed in color tests.

From its own experience, the Paris system finds that modern traffic conditions call for the best possible eyesight on the part of motormen and bus drivers, particularly in judging speeds and distances, danger of collision with cross traffic and sharpness of vision in twilight, the latter as determined by laboratory test.

With regard to hearing, only two out of eighteen companies reporting made no special tests. The author does not consider the usual standards high enough in the case of motormen and bus drivers, as trials have proved that a person with subnormal hearing tends to locate the origin of various sounds behind him when some actually have originated in front of him. A motorman thus afflicted would get into trouble with an unexpected vehicle. He should also learn to appreciate that the sounds made by various vehicles are affected by their rate of speed.

### Psychological Tests for Car Operators

With regard to mentality, the growing severity of traffic conditions makes it highly desirable that transport undertakings make the fullest possible application of the advances in psychology. The employment of men most apt for the service will give safer operation for the public, reduce accident costs, cut down the waste of energy and minimize upkeep charges.

As early as 1700 Vauban made a time and motion study of different classes of work. Some years after physiologists, following the road opened by Lavoisier, began to determine the relations between muscular energy and food (fuel) values. Then came a series of studies by numerous scientists down to this day with its host of volumes on the psychology individual to different professions. The work of vehicle operators has already given birth to valuable knowledge as summarized in the following paragraphs:

The first applications of psychology to platform work were made simultaneously in 1913 at Harvard University and by the former East Parisian Tramways (Compagnie des Tramways de l'Est-Parisien). During the war years the methods applied in choosing men for the air service were a guide to

TABLE SHOWING RELATION BETWEEN EXCITATIONS AND REACTION IN VISUAL AND AUDITORY TESTS

Name ..... No. of Errors: 5 Accuracy Index: 0.94

| Excitations | | Reactions | | | | Excitations | | Reactions | | | | Excitations | | Reactions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lamp | Sounds | Left Foot | Right Foot | Right Hand | Errors | Lamp | Sounds | Left Foot | Right Foot | Right Hand | Errors | Lamp | Sounds | Left Foot | Right Foot | Right Hand | Errors |
| Red | Metal | | | | 1 | Red | Wood | × | | | | Red | Wood | × | | | |
| Green | Metal | | | | 1 | Red | Wood | × | | | | Red | Wood | × | | | |
| Green | Wood | | × | | | Green | Wood | | × | | | Red | Metal | × | | × | |
| White | Metal | × | × | × | | White | Metal | × | × | × | | Red | Metal | × | | × | |
| Red | Wood | × | | | | White | Metal | × | × | × | | White | Wood | × | × | | |
| Red | Metal | × | | × | | White | Wood | × | × | 1 | 1 | White | Metal | × | × | × | |
| Red | Wood | × | | | | Red | Metal | × | | × | | Green | Wood | | × | | |
| White | Wood | × | × | | | White | Wood | × | × | | | White | Metal | × | × | × | |
| White | Wood | × | × | | | Green | Metal | | × | × | | Red | Wood | × | | | |
| Green | Metal | | × | × | | Green | Metal | | × | × | | Green | Metal | | × | × | |
| White | Metal | × | × | × | | White | Metal | × | × | × | | Green | Metal | | × | × | |
| Red | Wood | × | 1 | | 1 | Red | Metal | × | | × | | Green | Wood | | × | | |
| Green | Wood | × | × | | | Green | Wood | | × | | | Red | Metal | × | | × | |
| Red | Metal | | | × | | Green | Metal | | × | × | | Red | Wood | × | | | |
| Red | Wood | × | | | | Red | Wood | × | | | | White | Metal | × | × | × | |
| Green | Metal | × | × | × | 1 | Green | Wood | | × | | | Red | Wood | × | × | | |
| Green | Metal | | × | × | | White | Metal | × | × | × | | Green | Wood | | × | | |
| Green | Wood | | × | | | White | Wood | × | × | | | Green | Metal | | × | × | |
| White | Metal | × | × | × | | Red | Metal | × | | × | | White | Wood | × | × | | |
| Red | Metal | × | | × | | Red | Metal | × | | × | | Green | Wood | | × | | |
| White | Wood | × | × | | | White | Metal | × | × | × | | Green | Wood | | × | | |
| White | Metal | × | × | × | | Red | Wood | × | | | | Green | Metal | | × | × | |
| Red | Wood | × | | | | Green | Wood | | × | | | White | Wood | × | × | | |
| Green | Wood | | × | | | White | Wood | × | × | | | White | Metal | × | × | × | |
| White | Wood | × | × | | | White | Wood | × | × | | | Red | Metal | × | | × | |
| White | Metal | × | × | × | | Green | Metal | | × | × | | Red | Wood | × | | | |
| White | Wood | × | × | | | Red | Wood | × | | | | Green | Metal | | × | × | |
| Red | Wood | × | | | | Green | Wood | | × | | | White | Wood | × | × | | |
| Green | Wood | | × | | | Red | Metal | × | | × | | Red | Metal | × | | × | |
| | | | | | | Green | Metal | | × | × | | White | Metal | × | × | × | |

psycho-motor tests for women operators of the former Parisian Tramways (la Cie. Parisienne de Tramways). Army tests of this nature as applied to 20,000 automobile drivers showed that nearly 20 per cent were unfit and that ability decreased from 40 years on.

In more recent years psychological tests have been applied by the systems of Amsterdam, Barcelona, Brussels, Milan, Paris, Philadelphia, the German State Railways and others. Examination of results indicates that failure to start with a precise analysis of the job of car or bus driving has caused disappointment in some cases.

This analysis must be based upon a graphic motion study of vehicle operation, under both the diverse conditions of actual running and of laboratory tests where everything can be done in logical order. One aid toward the achievement of this result is the use in Paris of registering and recording devices on cars in every-day service. The following inventory of points to observe has been set up:

*Attention or distraction* (tests of Amsterdam, Barcelona, Brussels, Harvard, Paris, Philadelphia) is one of the most important to determine in the case of motormen and bus drivers as they are subject to numerous excitations. The tests show how a man reacts, with appropriate handling of his apparatus for a service or emergency application of the brakes, sanding, etc.

*Concentration* (tests of Amsterdam, Barcelona, Milan) is an analagous function, but in this case there is a single reaction to a single excitation.

*Rapidity and regularity of physical reactions* are studied by all, but some consider this function as simply a form of attentiveness and others as a simple muscular function.

*Local muscular force*, i.e., transmission to the muscles and the muscular system which come into play in the motorman's work.

*Fatigue resistance* (tests of Milan and Paris).

*Motor suggestibility* (test of Paris) is defined as the subject's aptitude for developing a sense of touch and muscular action that will enable him to exert just the right degree of control almost automatically (or subconsciously) amid all the confusing calls on his attention when running over a busy highway.

*Judging speed and distance* (tests of Amsterdam, Barcelona and Paris).

*Rapidity in perception of images* (tests of Paris).

*Perception of sound direction.*

*Impulsiveness* (tests of Amsterdam, Barcelona and Paris).

*Memory* (tests of Milan and Paris).

*Intelligence.* One does not expect intellectual eminence in motormen and bus drivers, but since intelligence does play a big part in all human activities even candidates for such humdrum work ought to possess a certain minimum of this quality.

## Methods of Psycho-Physiological Selection

Space does not permit an account of all of the researches made by various undertakings to discover the aptitude of candidates, but the methods can be classified into two groups: (1) That in which the candidate is placed in the psychological condition of a motorman at work to respond to stimuli which simulate street conditions, and (2) that in which a series of purely analytical tests are made.

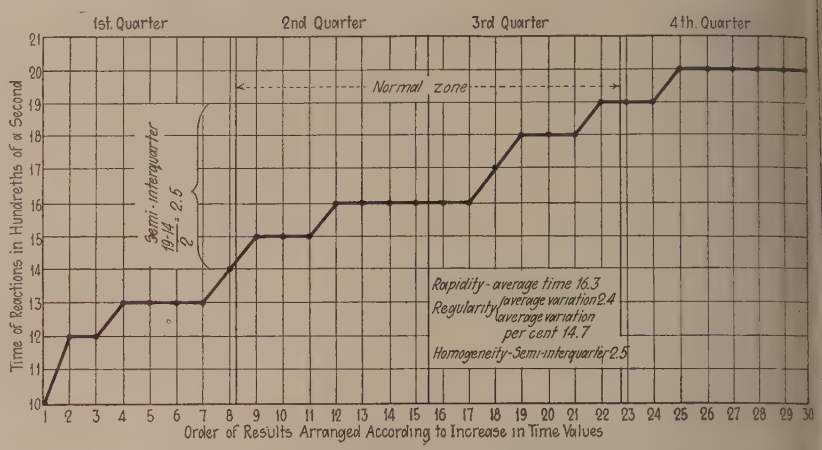

1st. Quarter
2nd Quarter
3rd Quarter
4th. Quarter
Normal zone
Semi-interquarter 19-14 / 2 = 2.5
Rapidity - average time 16.3
Regularity average variation 2.4
average variation per cent 14.7
Homogeneity-Semi-interquarter 2.5
Time of Reactions in Hundredths of a Second
Order of Results Arranged According to Increase in Time Values

**Fig. 3—Record of Reaction Times to Simple Sounds, Paris**

The former method is that used at Harvard University, Philadelphia and Brussels. Its value is not yet established. In any case it seems premature to admit that a single test of this nature should be allowed to replace one made under practical conditions where a much greater diversity of psychological functions are called into play.

In the case of Hamburg, the quickness of response and correctness of manipulation are noted in the course of the student's schoolroom lessons with actual apparatus, while watching a moving belt, illuminated from the back on which are various marks to represent "proceed," "stop," "man on track," etc. No effort is made to discover the future ability of the candidate as a motorman all at once, but the method does offer a practical examination which reveals the subject's aptitude for learning.

At Brussels the student or veteran under test actuates a pneumatic recording device with each manipulation of the control or braking equipment made in response to various excitations, such as images of vehicles and pedestrians. The times between the excitations and reactions are measured in tenths of a second. Fig. 2 is a typical record. The same scheme is employed at Paris in connection with the preliminary psychological tests. It is noteworthy that the Hamburg plan, which began only as a series of manipulations of apparatus, has become more and more analytical. It now includes, for example, tests in judgment of speed and distance.

With regard to the analytical tests, their effective use is a matter of combining and comparing the results from a variety of experiments, such as the following:

*Attention or distraction test.* The subject is usually placed in a dark room. Visual attention is then determined by causing the lighting of lamps of various colors in a predetermined order. Likewise, audition is tested by the production of various sounds. The subject's reactions are obtained by means of his differing manipulation of keys or pedals, following the display of different colors or the sounding of different noises. The accompanying table gives the record of a candidate on the Paris tramways who showed an accuracy of 94 per cent.

At Hamburg the subject of this test is asked to keep count of the successive illumination of a lamp despite the occurrence of some mental shock or the distraction caused by the lighting of other lamps. At Paris the latter supplement to the reaction test is effected by means of a moving-picture screen in service and lamps placed around it. The results of this test are determined by reference to the number of errors or omissions in the total number of excitations.

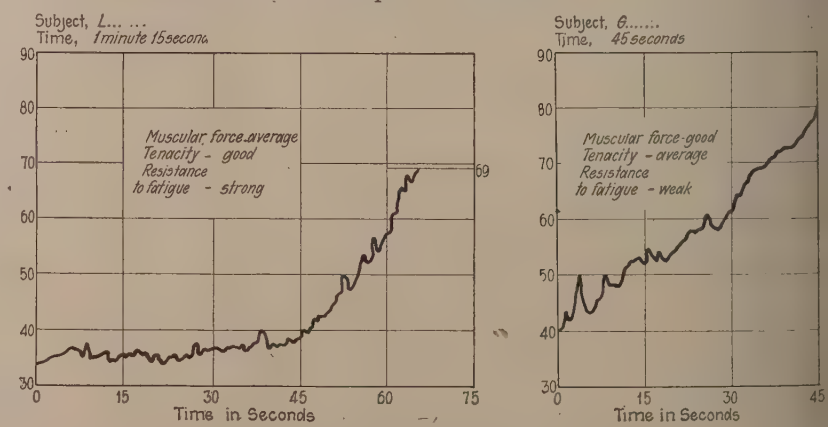



**Fig. 4—Graphs of Good and Poor Resistance to Fatigue, Paris**

*Concentration.* Only Milan has applied the classical test of the presentation of printed test cards, carrying certain symbols or signs. Dissatisfaction in that city with the results confirms the objections of those psychologists who had discarded this method. Others have considered the duration of reaction time as a proper measure of the concentration required by the work of a motorman. This is so only when based upon a large number of such tests so that, as at Amsterdam, the average between high and low values of each individual will serve as the concentration index or graph, as the case may be.

*Promptness of reactions.* Reactions to sounds are considered more practical than reactions to light because sound excitations are faster, but, of course, the results both ways should be compared for the best understanding of the situation.

The audition test is made by striking a special hammer on a table, whereupon the subject presses a key as rapidly as possible. Both hammer and key in making their contacts close a circuit to a chronograph which indicates in hundredths of a second the elapsed time between excitation and reaction. The figures are arranged in order of value, as shown in Fig. 3, to determine the qualities of rapidity, regularity and homogeneity.

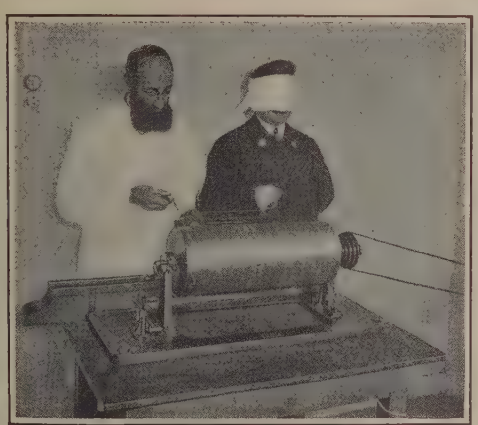
Rapidity is determined by taking the average time interval. An excessively long interval would cause the rejection of the candidate, but generally speaking the rapidity or tardiness of the subject is not the sole standard of judgment.

Regularity is determined by comparing the difference in time between successive reactions against the average of preceding differences in time. It is evident that this is a check of stability or psychomotive equilibrium, a quality which plays a large part in determining the aptitude of a vehicle driver.

Homogeneity, which might be considered as consistency in reactions, is determined by grouping the records given in Fig. 3 in four parts in the order of the time interval. The values of the first and fourth quarters are considered as aberrations and therefore are not utilized. The values in the second and third quarters are treated as the zone of normality. The consistency factor is then taken as half the difference between the last value of the third quarter and the last value of the first quarter. This is figured and called "semi-interquarter" on the graph, Fig. 3.

*Muscular force.* Unless the hand brake is in frequent use, a test to determine this quality is of no value save as a measure of resistance to fatigue. One of the devices used is Charles Henry's dynamograph. The applicant for employment squeezes a bulb filled with mercury which is thus forced up a tube open at the top. A float in the mercury serves to actuate a recording pen. Two typical records from this device are shown in Fig. 4. The record at the left, while showing a longer period of rise, has fewer peaks and indicates that the person making the record may have less strength but he has greater tenacity and so is less liable to fatigue than the person who made the record at the right.

*Motor suggestibility.* Tests for this faculty (which has already been defined as a sense of touch and a control of muscular action almost subconscious) have shown a definite relation to ability to operate vehicles in everyday practice. Measurement is made with the Binet apparatus, a cylinder with two recording wheels, one of which is turned by the examiner and one by the subject. When the examiner's wheel is turned it turns that of the subject, but by means of a ratchet the subject can turn his wheel independently of the examiner. After a bandage has been placed over the eyes of the subject the test begins. The examiner simply turns and stops his wheel while the subject strives to begin and end the turning of his wheel in synchronism with that of the examiner. The general method is shown by an accompanying illustration. Fig. 5 is the graph of a normal subject with good sense of touch, showing close parallelism to that of the examiner, while that of a subject not having this faculty shows almost no resemblance to the movements of the examiner.



**At Left—Test for Resistance to Fatigue; the Record Is Shown in Fig. 4. At Right—Test for Suggestibility; the Record Is Shown in Fig. 5**

*Judgment of speeds and distances.* Analysis of many accidents has shown that the driver's judgment of speed and distance was usually found at fault.

To check this quality, the Paris system has devised what it terms a tachodometer. This comprises a skeletonized table about 13 ft. long on which three toy cars are run at varying speeds and distances. The cars themselves are out of sight, but their position is revealed by projecting masts. These masts aid the examiner to read the distances on the scale which forms a fence for the cars. The subject, of course, is too far away to read the scale. The test consists in disposing the cars in various positions and at different speeds, whereupon the subject is asked to tell in what order the vehicles will meet and at what point. In sizing up the replies, allowance is made for both their rapidity and exactness. At Barcelona this test is considered one of the most important and has justified itself by the results in practice.

*Rapidity in perception of images.* This quality is important in a vehicle operator as an aid to avoidance of collisions. The apparatus used for this purpose, called a tachistoscope, includes a rotating disk with a slit of variable size. Through this the subject glimpses words, letters and simple pictures thrown on a dark-room screen. The exposures are for intervals from one-tenth to one-thousandth of a second, so that a test can be made of the ratio of recognitions by the subject.

*Recognition of sound direction.* Reference has already been made to the importance of this test. The subject is blindfolded and then he is asked to indicate from what directions the various sounds are coming.

*Impulsiveness.* A man who can do everything just right under conditions of security is not much good as a motorman if his emotions can be easily excited. Yet it is not an easy test to make because not all emotions affect everyone alike. Furthermore, a laboratory test may show one thing, and an actual roadway emergency something else. Since all emotions probably have a common center, the most profound researches may be required for a fully satisfactory answer.

However, one helpful test is that of psychic reflexes via a galvanometer. The subject places two fingers of the same hand on non-polarized electrodes in a circuit of less than 2 volts with a Wheatstone bridge in series to measure his resistance. A galvanometer is used to follow the variations in resistance. Note is then made of the intensity of this variation under a variety of emotional shocks or distractions. In one Paris test, a good subject showed a drop from 8,200 ohms, before putting on the test film, to 7,000 ohms following the fourth shock to his emotions, while a poor subject dropped from 7,300 to 5,300 ohms under the same conditions. The Paris system has found a close relationship between the imperturbability (*sang froid*) shown in the analytical tests and those involving the use of equipment.

As soon as a student is reasonably familiar with his equipment, he is put through a test in which unexpectedly a dummy is thrown 33 to 50 ft. in front of the car or motor bus. This so

staggers some operators that they abandon their control and brakes. Others are excited to the point of vomiting (one man was ill for two days), while still others apply the brakes too late. The practical effect of this test is to eliminate about 3.5 per cent of the motorman candidates and 5 per cent of the chauffeur candidates.

*Memory.* Car operators, of course, must have a good memory for the variety of conditions along their run, for signal indications, complicated rules and the like. The usual memory tests are not quite suitable for men in the motorman-chauffeur class. However, application is made of the scheme of word association [somewhat similar to that of the San Francisco Municipal Railway as described in the ELECTRIC RAILWAY JOURNAL for Dec. 8, 1923.—EDS.] The examiner reads to the subject twenty-five pairs of words having some relation in sound or meaning. He then calls off one word of each pair, the subject being expected to give the corresponding word. The comparisons are based on both the accuracy and the speed of response.

*Intelligence.* The tests so far used, such as the classification of diverse objects, apparently have not given definitely satisfactory results.

*Deductions from combined tests.* The essential point to consider is that no one test should be used as a basis for the selection of men, but rather that a judicious combination should be made from each type of analysis and with due correlation with the examinations involving manipulation of equipment. To achieve this end best, it is desirable that the greatest possible amount of data from international experience be made available so that a closer and closer relation will be obtained between a given kind of test and its practical application as a measure of the efficiency of the subject as an operator.

### OPERATING RESULTS IN PARIS PROVE EFFICACY OF PSYCHOLOGICAL TESTS

To show concretely the relation between the psychological tests and the behavior of successful candidates on the road, the Paris company made the following test:

Several groups of fifty applicants for positions as motormen for cars or drivers for buses were chosen. In one sense these men were already a select class because the company accepts applications for the front end only from employees who have already made good records as conductors. They were also of like ages to make the comparison of greater value. Fig. 6 shows the diverse reaction times of the first fifty. The results were divided in ten classes. Class 1 was called "very good"; classes 2 and 3, "good"; classes 4, 5, 6 and 7, "medium" or average; classes 8 and 9, "poor," and class 10, "very poor." These results were adjusted by various compensation factors based on other tests, and as applied to this and later groups resulted in placing the men in four categories.

To determine the relation between the laboratory and practical ability of the first group (all motormen), arrangement was made to have them examined in service by one of the most trusted and capable platform inspectors. Thirty-six out of the fifty were in this operating test, as two had been eliminated in the course of their apprenticeship and twelve had been assigned to other work or had resigned. None of the thirty-six was examined until at least one month's service, it being recognized that more than one man who shows well during apprenticeship and laboratory tests falls back to his natural low level and proves unsatisfactory when left to himself.

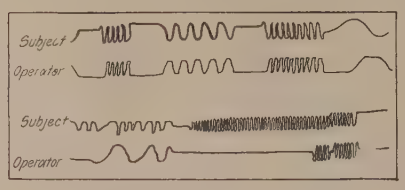



**Fig. 5—Record of Tests of Motor Suggestability, Paris**

From a comparison of the results of the laboratory tests and service judgments of the thirty-eight, the following facts appeared:

1. Of twenty-seven men classed as "apt" by the laboratory, twenty-three were classed as "good" and four as poor" from the operating viewpoint.

2. Every one of the eleven men classed as "not apt" by the laboratory was classed as either "poor" or "very poor' from the operating viewpoint.

In short, laboratory and operator agreed in thirty-four out of thirty-eight cases, or 89.5 per cent. Where the operator's judgment differed from the laboratory's, the latter profited by securing hints as to the nature of additional tests for bringing out weaknesses heretofore concealed.

Comparisons were made of further groups of fifty with particular reference to the qualities of resistance to fatigue, emotionalism, quickness in perception of images and judgment of speed and distances.

In the second series, thirty-six out of thirty-eight "apt" men were considered "good" and two "poor." Of twelve men classed "not apt," four were considered "good" and eight "poor." In this group of motormen, therefore, the percentage of agreement was 88 per cent.

In the third group were forty-eight candidates for motor bus driving. Of thirty-three classed "apt," thirty were considered "good" and three "poor." Of fifteen classed "not apt," eight were considered "good" and seven "poor." In this group of chauffeur candidates, therefore, the percentage of agreement was 77 per cent.

The average percentage of agreement for the three groups of 136 men was 84.5 per cent.

Such results justify the Paris management in advising others to follow like methods and also to study closely the percentage of agreement between laboratory and operator to the end that it may be raised still higher. The Paris psycho-technical laboratory is equipped to test ten men a day, a capacity which is sufficient to care for all applicants for the position of motorman or bus driver. The collaboration between laboratory and operating tests will be continued.

### INSUFFICIENT TESTS ACCOUNT FOR POORER RESULTS AT BRUSSELS

In the case of Brussels, which uses the test in which the candidate is placed in a condition simulating operating routine, the correlation percentage was much less than at Paris. Of thirty-seven men so examined, seventeen had been termed "apt" and twenty, "not apt." All of these men were then put to work and after two months were classified as "very good" if they had caused no accident, "fair" if they had caused but one accident and "poor" if they had caused more than one accident.

Of the seventeen men classed as "apt" by the laboratory, six proved "very good;" seven, "fair," and four, "poor."

Of the twenty classed as "not apt" by the laboratory, three proved "very good"; seven, "fair," and ten, "poor."

Two reasons are offered for the poorer results at Brussels: First, a single test does not take account of such factors as resistance to fatigue and the suggestability factor, which the Brussels management proposes to consider hereafter; second, a classification based upon freedom from accident leaves too much to chance since it is conceivable that a poor operator might have the luck to escape accident-creating conditions.

The Philadelphia method is reported to give an agreement factor of 80 per cent.

At Berlin 5 to 12 per cent of the motormen used to be eliminated during the apprenticeship period. To-day, with psychological selection in use, the

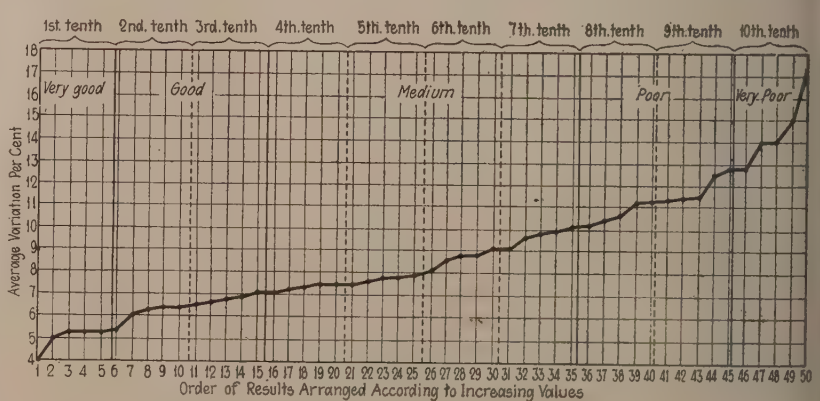



**Fig. 6—Record of Regularity of Reaction Times, Paris**

elimination figure has dropped to 0.13 per cent. Furthermore, the period of apprenticeship is but 66 per cent as long as before while accidents have been reduced 45 per cent. [The basis on which accident reduction was figured is not given in the paper, and possibly the gain is exaggerated because of the less mileage run in Berlin during 1922 and 1923.—EDS.]

### LOW COST AND LITTLE TROUBLE TO FIND CANDIDATES

The foregoing review of psychology applied to selection of platform men shows that while there is yet much to learn, enough is known to be of great helpfulness today. Development along these lines should be encouraged as much as possible to the end that still greater gain may come.

The question has often been asked whether the laboratory tests are not so severe as to cause a shortage of applicants for positions. In Paris and on other Continental systems, this is not observable because drivers are taken from the staff of conductors whose ability in certain directions has already been demonstrated in operation. Hence the psycho-technical tests are intended less for the elimination of the unfit than to fit each man to the type of job he can do best.

Before the days of laboratory tests, also, about 15 per cent of motormen candidates and 23 per cent of chauffeur candidates failed to make good during their apprenticeship. The percentages of rejection in laboratory tests (which precede all the time and cost of apprenticeship) is somewhat higher but appears largely justified in the better grade of men obtained. The selection of better men is not the only advantage of the psycho-technical examination because these men learn faster and more thoroughly.

Following the experience with one installation at the laboratory, the Paris company is installing at every school for motormen a combination of platform apparatus and recording devices which reveal improper operation of control and braking appliances to such a degree that it is possible to follow the progress of each pupil in correct manipulation.

There is the final question: "What does this laboratory work cost?" While it may not be possible for smaller railways to use these methods, there is no doubt that they should be used by the bigger systems because the unit cost is low. At Paris this cost, exclusive of amortization of the laboratory equipment, amounts to 30 francs (say $1.50) for an examination of 90 minutes. To judge whether this is worth while, consider some of the costs with which the Paris system has to deal:

First—The laboratory tests have eliminated 85 per cent of the 650 candidates a year formerly rejected in the course of apprenticeship after an average of seven days' training. This means an approximate saving of 3,850 man-days or about 130,000 francs ($6,500). Considering a reduction of 20 per cent in the duration of the training period on account of the greater uniformity of the students and absence of the unfit, there is a further saving of 12,000 man-days with 400,000 francs ($20,000).

Second—It is permissible to figure that with a more select class of vehicle operators there will be substantial reductions in the 4,000,000 francs ($200,000) annual accident costs due to these employees; in the 57,000,000 francs ($2,850,000) power and fuel charges, and in the 58,000,000 francs ($2,900,000) rolling stock maintenance.

Obviously, a very small percentage of reduction in such costs as these would pay for the laboratory tests many times over.

Thanks are due to the many psychologists and physiologists of various Paris institutions for their advice and their facilities.

### THE QUESTIONS OF RE-EXAMINATIONS AND ALCOHOLISM

Most electric railway systems have the rule that platform employees ill for more than three months have to pass a special examination before they are allowed to return to service. In some instances motormen or bus drivers are subjected to a like examination following an accident for which they have been judged responsible. In the engagement of employees, those systems which have a pension system generally also insist upon a thorough examination before putting a man to work.

Of twenty-one companies which responded to the question in the data sheet as to whether they held periodic re-examinations of veteran employees, eight replied that they considered such examinations needless. It is noted, however, that in most cases these were small roads whose managers are probably individually well acquainted with the employees under their direction. The re-examinations conducted by the other undertakings varied as to interval but averaged every three to five years except that some conducted no re-examination until a man was more than 45 years old.

The practice of Paris is to re-examine motormen and bus drivers at intervals of 5 years up to the age of 45 years, at intervals of 3 years between the ages of 45 to 54 years, and every year thereafter. The acuteness of hearing and vision are the essential points in these re-examinations, supplemented by a general medical examination, if necessary.

Psycho-technical tests are still too new to be applied to veteran employees, but a number of the systems reported that they planned to make such tests in future. The Paris re-examinations of men considered responsible for accidents have shown in some cases the need for the tests of judgment of speed and distance, and in other cases that some recent mind or heart (psychiatric or cardiac) trouble was the cause. As a rule, men who can no longer meet the requirements for the front platform are given work on the rear platform where good physical condition is of less importance.

Outside of such cases of alcoholism as are revealed in medical examinations, Continental roads do not seem to follow any other procedure other than reports made by inspectors on employees given to excessive drinking. It seems that alcoholism has been reduced since the World War because of the high price of liquor. At any rate, the managements punish severely, even to discharge, any employee found drunk or reported to be in an intoxicated condition while in service.

Some managements go farther than this and forbid platform employees to visit saloons during working hours and others supplement this rule by furnishing soft drinks without charge, including some hot drink in the early hours of winter days. Low-price restaurants are conducted by some properties and are found of value in keeping the men from temptation. On the Paris system, secret service men circulate in drinking places. Employees found in them are warned by letter. The Paris management believes, also, that its periodical examinations are of value in restraining alcoholic excess.

Finally, welfare activities such as the formation of music, athletic and arts clubs are encouraged as a means of keeping the men out of trouble during their off-hours.

## Restoring Public Confidence in the Railways*

BY R. B. STEARNS
Vice President and General Manager
Eastern Massachusetts Street Railway

THE fact that the electric railway industry is confronted today with a discussion of whether or not street cars are going out of business, is more or less an indictment of its policy in failing to take the lead. The industry is not going out of existence. It is just getting ready for business on a more extensive basis, and needs only more confidence and support from the public and less fear of decadence. There is no reason why the street railways should not, under proper regulation, continue the business of local transportation and furnish all the local service, whether by the present street cars on rails or by buses and taxicabs.

The Eastern Massachusetts Street Railway is a striking example of what has taken place in the industry in the way of restoring property to its proper usefulness since it crumbled and broke during the war period. One of the first things done under the service-at-cost principle of the public control act was to establish a flat 10-cent fare. The property was divided into separate districts so that when cost in the districts could be determined and conditions warranted, fares could be charged in accordance with the cost of transportation in that district. The organization was put on a divisional basis. The theory of this was that car riders were concerned only with transportation costs and problems in their immediate district and had long felt that they were abused through being required to bear costs in other territories in which they had no interest.

Results have demonstrated that this theory was sound and that it has done much to establish public confidence in the street railway. Every possible operating economy was put into effect

*Abstract of a paper presented at the eleventh annual conference of the Babson Organization, Babson Park, Mass., Aug. 8, 1924.

including operation of one-man cars, ultimately to the extent of 96 per cent of all service, adjustment of service by local supervisory organizations and the most economical maintenance of roadway and equipment. These and other economies have made it possible from time to time to reduce fares in the various districts so that at the present time, while the basic 10-cent cash fare has been maintained, by the use of reduced rate tickets here and there, the weighted average fare is 6.89 cents.

Moreover, in the year 1923, the company earned its interest on the investment.

In our case it was discovered that nothing succeeds like success. Just as soon as we turned the balance slightly in our favor, then those who were most pronounced in their outcries acknowledged that there was nothing else we could have done to save the street railway industry, and that our positive stand assured the preservation of the only reliable transportation needed in the community. At present the overwhelming majority of the people are favorably impressed by the disappearance of the jitneys and the rehabilitation of the street railway property, the introduction of new cars and the general all-around improvement in operation. A minority, of course, continues to howl loudly.

Every street railway should promptly put its property in condition to render the best and most practical service to the public consistent with the maintenance of a sound financial condition, to bring about the restoration of credit and to command the respect and support of the public. There is evidence to show that this is being done in a courageous manner throughout the country.

## West Virginia Utilities Convention in November

THE annual convention of the West Virginia Public Utilities Association will be held in Charleston, Nov. 14 and 15. The date of the annual meeting was put off until after the general election. In addition the members of the association will have opportunity to attend the West Virginia-Washington & Lee football game, Nov. 15.

## Central Traffic Association Meeting

THE next regular meeting of the Central Electric Traffic Association will be held at Yellow Banks Hotel, Webster Lake, Ind. on Sept. 12 and 13. This meeting will consist of a round table discussion, meetings of committees, committee reports and such other business as may be properly presented.

# Badger Railway Men Meet at Madison

### Practical Discussion of Operating Problems Features Summer Meeting of Railway Section of Wisconsin Utility Association —Benefit Organizations, Group Insurance and Pension Plans Also Considered

FOLLOWING a day of interesting entertainment, the railway section of the Wisconsin Utility Association devoted the second morning to a discussion of ways of improving track construction, car maintenance, and reducing labor turn over. In addition to these general discussions papers were presented on storeroom practice and accident prevention.

The activities of the first day included a trip through the Capitol building, an inspection of the university and other points of interest, and a boat ride on Lake Mendota. A dinner dance was held in the ballroom of the New Hotel Lorraine that evening. Dudley Montgomery, vice-president and general manager Madison Railways, chairman of the section, opened the meeting on Friday with an address welcoming the 120 railway men and manufacturers' representatives. He referred to the improvements in the financial and physical condition of the industry, and pointed out the recent successful sales of electric railway securities to passengers as examples of the return of public confidence in the business. During the year there has been a steady growing public consciousness that street cars are a vital part of city life. In substantiating this statement he cited the results of attempted bus operation in Saginaw, Akron, Toledo, Bridgeport and Des Moines. However, he stated that buses have an important place in the transportation field in connection with city and interurban service in sparsely settled districts where it would be too expensive to extend and maintain railway service.

"Accidents, Their Causes and Prevention," was the subject of a paper read by J. I. Searles, railway superintendent at Ironwood, Mich., of the Lake Superior District Power Company. Stating that fully 99 per cent of all so-called accidents are caused by carelessness of some one's part, he enumerated the ways by which his company first reduced accidents for which it was responsible, and then minimized the automobile accidents. A bonus plan was inaugurated giving to each car operator a cash award of $50 for every twelve months of operation without an avoidable accident. The plan also stipulates that for the first avoidable accident, the operator is penalized $5, for the second he is given a rate reduction of 4½ cents per hour for a month, and for the third he is discharged. The method has improved conditions to such an extent that during the existence of the plan only two men have been penalized. According to Mr. Searles the communities through which his property operates, experienced 45 automobile accidents during a period of twenty days, while for a period of 45 days the street cars operated 65,000 car-miles, without one accident. He attributes this record to the fact that all car operators are taught to assume that every automobile driver is deaf, dumb, blind and drunk. The latter condition is quite prevalent in his territory, stated Mr. Searles and is the cause of many accidents. One method of combating this accident danger is by working in close co-operation with the police department and causing the arrest and fine of any person found driving while intoxicated. Another method along which has proved successful is to have car operators report daily the persons seen driving carelessly. A letter is written to these persons giving the time, place and nature of the driving and indicating to them their responsibility in the matter. Should such a person later become involved in an accident with the railway, it would be his second offense and prosecution relatively simple. In conclusion Mr. Searles said that only through co-operation with the motorists will streets be free from accidents.

An interesting description of modern store-room methods was given by W. G. Barnett, storekeeper of the Chicago, North Shore & Milwaukee Railroad. In the discussion which followed several manufacturers' representatives asked for closer co-operation between the stores department and the manufacturer in order that purchased material might be delivered before the storeroom stock was exhausted.

In connection with the labor question, J. C. Schade, manager of railways, Wisconsin Public Service Corporation, presented a concise paper dealing with methods employed to reduce turnover.

Bridges, ships, houses, machines, in fact anything made by men can be moulded into exact duplication, but among the millions and millions of men on the earth there are no two alike, and therefore no set formula would be entirely practical in selecting men and welding them into working units. The selection of men is not so important as proper handling after the selection is made.

A man may be the finest mechanic in his line and his selection may be prompted because of his skill, but if he does not fit in with the general scheme of things his workmanship comes to naught. On the other hand if his skill is not recognized and given proper credit he rightfully falls into the ranks of discontent and his efficiency is impaired. Many a man has been forced into the "work, eat and sleep" habit because his initiative has been curbed by an over ambitious immediate superior.

Contentment is the best preventative for commercial unrest, and contentment comes to any man when he knows that his efforts and ability are recognized. The most dangerous misfits are men placed in executive positions who will not recognize the human side. There is a human side to every man's makeup which must be recognized if we expect to keep harmony. This does not mean that we must be sentimental or permit tradition to interfere with new methods or practice, but we should try to reach a happy medium as between the man, his ability, and his general make-up.

Discussing the subject, R. M. Howard, Winona, Minn., explained how his property treated the new man with

tolerance, placing him temporarily on probation during which period he was encouraged to become thrifty and keep his mind on his work. The old employees are well taken care of on his property, he said. Three types of employee beneficial work is performed on the North Shore Line, according to B. W. Arnold, the men belonging to an employees' benefit association, sharing in a pension system during old age, and their heirs receiving insurance money through group insurance policies. Mr. Arnold spoke very highly of group insurance as a means of relieving the man's mind while working. Labor turnover will be a minimum if the men feel right toward the officials and have affection for the men at the head of the company, was the concluding statement by Mr. Arnold. Additional discussion by A. J. Goedjen, Menominee, and Nels Rasmussen, Green Bay, commended group insurance and pension plans as means to reduce discontent among employees.

Many practical points about track and paving construction and maintenance were given in papers read by A. A. Oldfield, Fond du Lac, and Clyde L. Hedges, La Crosse, which opened the general discussion of the subject. Both speakers gave specific examples of construction and maintenance methods as practised by their companies. Mr. Oldfield predicted that all new track construction would be of the solid type in order to withstand the heavy vehicular traffic. Manganese switches and crossings are now used as standard by his company. Mr. Hedges explained the various methods of track construction with Dayton resilient ties, using brick and concrete pavement. The discussion which followed was confined to specific examples of construction work carried on by the companies represented.

Believing that too much stress has been put on advantages of light weight interurban cars, E. M. Lunda, Green Bay, pointed out the dangers of going to an extreme in building cars for interurban service that were too light. His paper dealing with "Safety Car Operation and Maintenance" contained many practical maintenance kinks for this type of equipment. The methods employed for periodic inspection of the various details of the car were given by Mr. Lunda.

Maintenance of electrical equipment of cars was the subject which was discussed freely by the mechanical men present. The first paper by Nels Jensen, Wausau, summarized the work performed along these lines on his property. According to Mr. Jensen the worst enemy of electrical equipment is dirt. Consequently the matter of maintenance is fundamentally a question of cleanliness. Methods of protecting the equipment from dirt and removing it, were the outstanding points of Mr. Jensen's paper. E. F. Hara, of Oshkosh, followed with a paper setting forth the methods employed by him in inspecting motors, controllers and other electrical equipment. Inspection of city cars is on a 1,000-mile basis, at which time the motors, brush-holder insulators, and controller fingers are cleaned up. The air compressor is cleaned, inspected and oiled. Interurban cars are inspected on a 1,400-mile basis, while 70,000 miles of service is used as a base for complete overhauling. According to Mr. Hara, systematic replacing of worn electrical parts is the secret of successful operation. A paper on this same subject presented by Henry Cordell of Highwood, Ill., concluded the business session. Mr. Cordell's paper will appear in a later issue.

The last item on the program was a talk by J. W. Colton, editor of *Aera*, summarizing the achievements of the electric railway industry. Among some of the pertinent facts brought out during the talk, Mr. Colton said: "Progressive railway men recognize that the bus has a place in transportation and that place is as a supplement or auxiliary to the rail lines. More than 150 electric railway companies are operating more than 1,600 buses, and at least 400 more are on order. With the public informed about the industry, about the costs of electric railway operation, the costs of bus operation, the effects of unfair competition, the effects of unjust and burdensome taxes, it should not be long before even the most skeptical will be convinced that the electric railway is a permanent institution."

# American Association News

## Entertainment

A MEETING of the entertainment committee of the American Association was held at Association headquarters, New York City, on Aug. 20 to consider the entertainment features of the program for the Atlantic City convention next October.

Details of the various features arranged were reported on by the various sub-committee chairmen. Mr. Dewhurst outlined the proposed program for the entertainment of the ladies attending the convention. On Monday afternoon there will be obstacle golf on the course of the Marlborough-Blenheim. Tuesday afternoon arrangements are being made for cards at one of the hotels. Wednesday afternoon it is planned to have a concert featuring an opera singer. Thurday afternoon there will be a motor trip.

For general entertainment it is planned to hold an informal dance Monday evening. Tuesday evening's entertainment has not been decided definitely, pending the decision of the meetings and subjects committee as to whether a formal address will be given by some speaker of national prominence. It is planned that in the event there is no speaker assigned for that evening a special entertainment will be provided by Mr. Cotsworth's committee.

The plan for the Wednesday evening feature, "Play Night," was outlined by Mr. Hale. This will be a novel event which will provide amusement and excitement for all, the exact nature of which will be reserved for the present. It will be entirely different from the attractions which have featured previous conventions.

Considerable discussion took place regarding the grand ball to be held Thursday night. Mr. Palmer desired to keep the ball formal in order to make it different and distinct from the informal dances held at various times during the convention. It was decided to have suitable dance programs prepared for the ball.

Those present at the meeting were F. H. Gale, chairman; J. V. Sullivan, vice-chairman; F. L. Butler, Frank Killian, J. A. Dewhurst, L. H. Palmer, M. A. Oberlander, S. J. Cotsworth, G. R. Rowland, A. A. Hale, L. W. Shugg, Morris Buck representing Harry L. Brown, and G. C. Hecker and F. C. J. Dell of Association headquarters.

## Transportation and Traffic Executive Committee

THE meeting of the executive committee of the Transportation and Traffic Association was held at Association Headquarters, New York City, Aug. 19. Those in attendance were President J. K. Punderford, chairman, T. C. Cherry, J. V. Sullivan, Edward Dana and W. H. Boyce. G. C. Hecker acted as secretary of the meeting.

The minutes of the previous meeting held in St. Louis on March 3 were read and approved with minor modifications.

The various committee reports were then taken up and discussed and the following committee reports were read and approved for printing, with a few modifications: Accident prevention; Development of New Business; Relief of Traffic Congestion; Trackless Vehicle Operation.

The lists of those invited to discuss the various committee reports were reviewed and several additional men suggested. The secretary was instructed to issue invitations to those suggested for taking part in the discussion and obtain their consent as early as possible.

The committee reviewed the preliminary convention program and approved it including the suggestion made by Mr. St. Clair that the advertising and publicity symposium be placed ahead of the report of the committee on trackless vehicle operation.

Mr. Punderford announced the appointment of a committee on subjects for next year.

The committee discussed the policy in regard to the approval of committee reports in the future. It was suggested that hereafter each committee chairman prepare a sufficient number of typewritten copies of his report and supply a copy to each member of the executive committee as early as possible after July 1. It was the sense of the committee that a meeting of the executive committee should then be called and invitations extended to each committee chairman to be present at the meeting and take part in the discussion of the reports. When the reports were approved by the executive committee they would then be turned over to the secretary for publication.

The next meeting of the executive committee will be held in Atlantic City, Oct. 6 at 11 o'clock.

# Maintenance of Equipment

## Gaging Trolley Wire by Schedule

BY G. H. MCKELWAY
Engineer of Distribution, Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

MANY railway companies measure the diameter of the trolley wire either at the ears or in the middle of the sections, and from the results of such measurements decide when and how much of the trolley wire to renew. This method gives an accurate record of the condition of the wire, but if the frequency of the inspection is not specified some lines will receive more examinations than they really need, while others will not be gaged often enough.

Except where there are heavy grades or other unusual conditions to cause the copper to soften or be burned away, the wear on the wire is roughly proportional to the number of cars passing under it. The headway of cars may thus assist in determining the necessary frequency of gaging. Where more than one line uses the same street the headways of the lines should be combined.

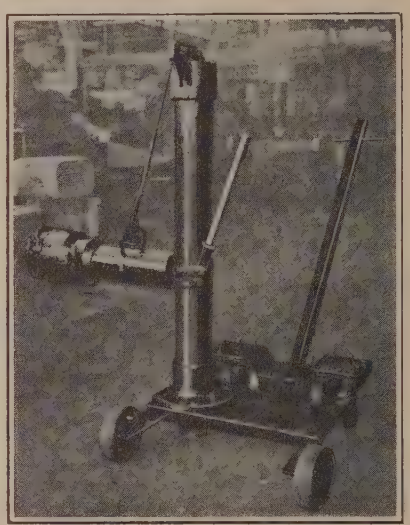
Our practice is to divide inspection into four groups. Some sections are gaged every six months, some every twelve months, others with light service are gaged every eighteen months; and where the service is still lighter every two years.

To make sure that this plan is followed carefully a complete schedule is prepared showing when each line should be gaged during a two-year period. Each monthly heading gives the names of the streets, on which the wire is to be measured during that month. A sufficient number of lines are given to keep the men busy, and yet not to give them more work than they can handle during that month. Where cars are turned back on a long line so that there is not the same amount of traffic over all parts of it, or where other lines turn into the same street, the line is divided into two or more sections and these sections are measured at different intervals.

This plan has worked out well in practice, has prevented the measurement of wire at too frequent intervals, has kept the number of trolley breaks down, and has made certain the gaging of some outlying and unimportant lines which were sometimes overlooked, under previous methods.

## Handy Mounting for Pinion Pullers

IN THE shops of the Department of Street Railways, city of Detroit, the Woods pinion puller used in the armature room is



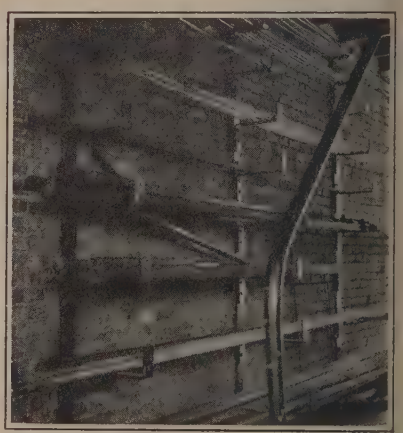
Portable Pinion Puller Used at Detroit

mounted on a portable "buggy" in the convenient manner shown in the accompanying illustration. An upright hollow pillar is securely bolted to the framing of the "buggy" and has mounted at its upper end a set of pulleys over which the flexible cable supporting the pinion puller operates. On the interior of the column a counterweight balances the puller so that it can be readily handled in any position. In addition to facilitating the work of moving the pinion puller from place to place about the armature shop, the arrangement also has an additional advantage from the standpoint of safety. There is sometimes a tendency for the puller to jump away from the armature when a particularly tight pinion suddenly comes loose. With the support illustrated, the puller is confined by the cable and prevented from rebounding any great distance.

## Pipe Supply Kept on Racks

NEATNESS in the appearance of the pump room at the shops of the Illinois Traction System has been accomplished by racking all pipe in an adjacent room. This room was formerly a passageway from the outside to a stairway leading to the second floor. An opening was made into the pump room and the pipe rack mounted on the wall alongside the door which leads to the outside yard. This location enables long lengths to be placed and removed through this door.

The rack consists of four sets of supports or arms spaced 3 ft. apart, arranged for holding nine tiers of pipe. Large 2½-in. pipe is placed at the bottom and small ¼-in. pipe at the top. Supports are riveted to a 2-in. x ½-in. piece of steel which extends from the floor to the ceiling and is securely fastened to the brick wall. They are made up of 1½-in. x ½-in. steel and vary in size and spacing. The largest support is 12 in. long with a leg at the end 3 in. high, and is spaced 12 in. below the next one above. The smallest is 4 in. long

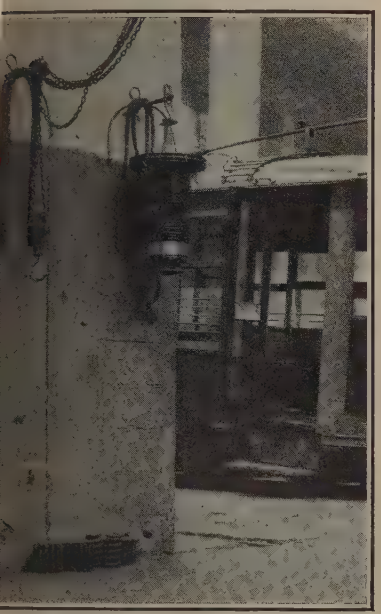


Pipe Racks Installed by Illinois Traction System at Decatur Save Time and Improve the Appearance of the Shop

with a leg 1½ in. high and is spaced 6 in. above the next one below. Between these two extremes are seven other supports of proportionate sizes and spacings. The rack was built in the shop and has proved a time and labor saver.

## Spare Armatures Hung in Handy Location

A RATHER unusual degree of standardization in rolling stock has been accomplished by the Bangor Railway & Electric Company, Bangor, Me. This company is said



Vertical Suspension of Spare Armature in the Shops of the Bangor Railway & Electric Company

to be the first railway in New England to adopt the Birney safety car, and since the original installation nothing but safety cars have been purchased. At the present time the equipment consists almost entirely of cars of this type, both single truck and double truck, and this has resulted in reducing the number of spare armatures which it is necessary to keep on hand. Spare armatures are suspended vertically from brackets on the wall of the carhouse, as shown in the accompanying illustration. A round iron horizontal rod has been driven into the wall. On the outer end of this is a simple hook which grasps the armature by the pinion. This method of storage is feasible on account of the light weight of these armatures.

## Gas Cutting Equipment on Wrecking Truck

THE clearing up of a wreck can often be carried out more quickly if gas cutting equipment is used. The Pacific Gas & Electric Company, Sacramento, Calif., has added a portable oxyacetylene cutting outfit to its wrecking equipment carried on a truck. The cutting equipment is inclosed in a metal case about 2 ft. high and 18 in. square. It is arranged so that two men can carry it readily. A cylinder of commercial oxygen and one of acetylene gas are carried in this case equipped with the necessary gages and 25 ft. of tubing. The torch cuts ½-in. boiler plate at the rate of a foot a minute. The total capacity of the tanks is sufficient for operating the torch 7 hours.

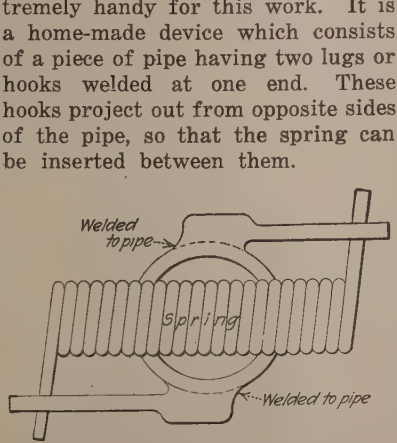
## Movable Scaffold for Painting Shop Interior

FOR convenience in painting the inside of its Harmon shops the New York Central Railroad is constructing a scaffolding mounted on a flat car. This scaffolding is in the form of a tower with a top section which can be raised and lowered. With the tower in its down position, clearance is provided underneath the lowest parts of the shop. At lighting bays where the height is greatest, the top extension is raised. Side extensions are also provided so that the sections of the structure which come in between the tracks can be reached readily by workmen. The painting is to be done by the spray painting method.

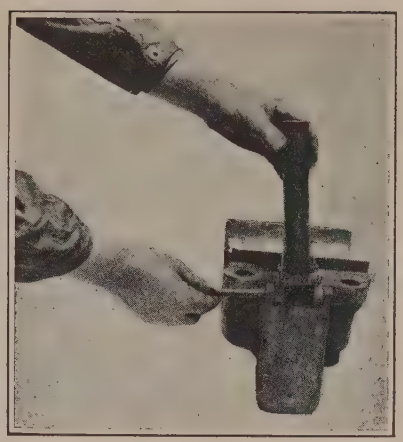
## Tool Helps to Insert Springs

WHEN it is necessary to insert new coiled springs for the covers of various forms of oil boxes used on electric railway cars, the job is usually done with the aid of a screw driver, or other hand tool, and the spring is put into place after considerable effort.

In the shops of the Omaha & Council Bluffs Street Railway, the simple jig shown in the accompanying illustrations has been found extremely handy for this work. It is a home-made device which consists of a piece of pipe having two lugs or hooks welded at one end. These hooks project out from opposite sides of the pipe, so that the spring can be inserted between them.




Inserting a Spring in an Oil Box Lid with the Aid of the Jig



End View of the Jig Showing How a Spring Is Held

Thus the spring is wound to any desired tension, slipped between the lugs so that the ends of the spring are held, and when the bolt or pin in the box cover is put in place the jig is withdrawn and the spring remains in position with the desired tension. The accompanying sketch shows a view of the end of the jig, illustrating the manner of holding the spring.

## Testing Field Coils

NEWLY wound motor field coils are tested at the Decatur shops of the Illinois Traction System by means of an induction tester shown in the accompanying illustration. This apparatus is in effect a core type transformer, of which the field to be tested is the secondary and a special exciting coil the primary. The primary coil is permanently mounted on one leg of a laminated iron core, while the field coil under test is slipped loosely over the other leg of the core. Alternating current at 110 volts, 25 cycles, is supplied to the exciting coil, which induces an electro-motive force in the coil under test.

In operation the field coil to be tested is slipped over the free leg of the core, and the magnetic circuit is closed by replacing the upper section of the core, which is hinged and is readily removed. Current is then turned on in the primary. If there is a short circuit in the field coil under test, the ammeter connected in series with the primary coil will indicate an excess current above that normally required for magnetizing the iron. This latter reading is constant under all conditions, and is known beforehand. It represents the current necessary for cutting up the magnetic flux and supplying core

losses in the iron and heat losses in the primary coil.

The entire apparatus is mounted on the work bench so that the lower leg of the core is beneath the surface of the bench. This allows the coil under test to lie flat on the bench. The distance between the two vertical legs of the core is approximately 18 in., so that plenty of room is allowed for slipping any ordinary field coil over the pole. The laminated core is made of No. 24 gage soft steel 4 in. wide, and built up until the core is 4 in. thick. Enough wire is wound on the exciting coil to give a rating of approximately 10 amp. on the a.c. ammeter when the core is closed and a perfect field coil is inserted for test.

As this company builds all of its own field coils for various types of motors, this apparatus has proved a big asset in accurate testing of these coils and has prevented failures in service.

**Motor Field Coils Are Tested at the Decatur Shops of the Illinois Traction System by This Induction Apparatus**

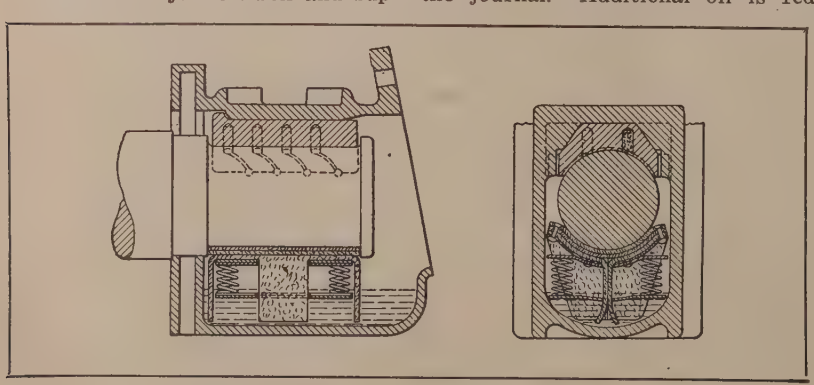
# New Equipment Available

## Journal Box Lubricating Device

A RECENT development in truck journal lubrication called the Phee system which has been tried in Boston and Milwaukee, is being marketed by the Froedtert Equipment Corporation, Milwaukee, Wis. Initial tests of this device were made on the surface cars in Boston. A car of the Milwaukee Electric Railway & Light Company has been operating with this device since March 17, 1924. A total mileage of slightly more than 12,000 has been made since the device was installed. At that time 1.7 qt. of free lubricating oil was placed in each journal box, and no additional oil has been added since then. This car has 4½ in. by 8 in. journals.

As shown in the accompanying diagram, a metal plate rests on the bottom of the journal box and supports the upper portion of the device by means of six springs. The upper portion has two metal plates which in turn support three layers of wool felt ⅜ in. thick. The bottom layer of felt projects at each end sufficiently to drop down to the bottom of the box and two additional strips of felt project downward to the bottom of the box through the center of the metal plate. The top two layers of felt are 1 in. shorter than the journal bearing surface to allow for lateral movement, thus the layers of felt when in position are held in contact with the bearing surface by means of springs. In addition, the brass, which is of the standard type, has a series of holes of ⅜ in. diameter and ⅝ in. depth drilled along each side and connected by channels ⅛ in. deep.

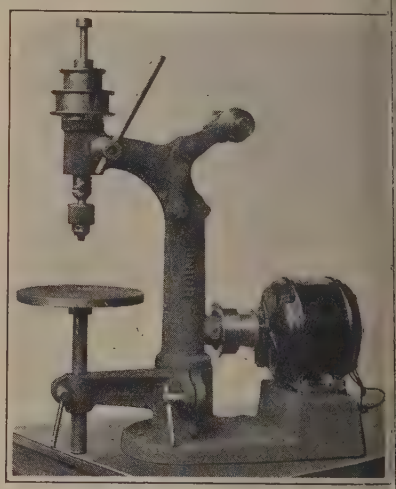
Oil is fed to the bearing surface by the pad remaining in contact with the journal. Additional oil is fed to the pad as required by the four wicks which dip into the free oil at the bottom of the box. These wicks serve not only to feed the oil but also to filter it as it passes up and to act as a guard at each end for preventing foreign matter from coming in contact with the bearing surface. The purpose of grooving and drilling the brass is mainly to insure a plentiful supply of free oil to the bearing surface during the time required to wear the brass to a bearing seat.



**Details of Journal Box Lubricating Device**

## Improved Bench Drill

AN IMPROVEMENT has been made in the 10-in. Junior motor driven drill manufactured by the Buffalo Forge Company, Buffalo, N. Y. In the older design a pinion and gear were employed which made operation noisy. The new method of drive is through a belt with pulley keyed to the shaft of a ¼-hp., 1,750-r.p.m. motor. This makes a quiet positive power transmission and saves space. The spindle runs in a large bronze bushing, and is provided with a No. 2-A Jacobs chuck. There are two speeds. Shifting from one speed to the other is accomplished without using any tools, as the idler works with a snap socket. This eliminates the use of set screws.



**Motor-Driven Bench Drill**

This is the smallest power drill manufactured by this company. It has a substantial cast-iron frame and a finished round table movable in both horizontal and vertical positions. The normal driving speed is 550 r.p.m., although it can be driven as high as 3,000 r.p.m. and still remain in perfect balance. The height of drill is 27½ in. and it will drill holes up to ⅜ in.

# The News of the Industry

## Mr. Hedley Talks Buses

### bway Head Opposed to Lines Other than Those Designed to Be Run as Feeders

Frank Hedley, president and general anager of the Interborough Rapid ansit Company, New York, said on ug. 21 that the company would oppose y independent bus system not con-cted with and feeding the city-owned bway system operated by his com-ny.

His remarks were prompted by a oposal which had been made the day fore by the Fifth Avenue Coach Com-ny to establish 35 new bus lines in ew York City, comprising 116 miles route. The crosstown lines would erate on a 5-cent fare and the trunk es on a 10-cent fare. The city would t 2 per cent of the gross income. It uld have the privilege of recapture der arrangements to be made later, t suggested tentatively by the Fifth enue Coach Company in the form two alternative plans.

Mr. Hedley's statement followed ickly upon the announcement of the thdrawal of himself and Vice-Presi-nt W. Leon Pepperman from the rectorate of the bus concern. Fred-c T. Wood, president and general anager of the Fifth Avenue Coach mpany, has likewise withdrawn from e directorate of the Interborough and e two corporations now apparently nd completely severed.

In this connection Mr. Hedley ex-ined that the Interborough Rapid ansit Company is not interested in an nibus company and never has been interested. The stock of the Inter-rough Rapid Transit Company ten ars ago was almost entirely in the asury of the Interborough-Metro-itan Company. At that time the ne company had a little less than e-half of the shares of the company ning the Fifth Avenue Coach Com-ny. That investment at that time resented only about one-third of 1 cent of the investment of the Inter-rough-Metropolitan system. Since n the Interborough Consolidated rporation (successor to the Inter-rough-Metropolitan Company) has ne into bankruptcy and its invest-nt in the omnibus business in New rk was distributed among the cred-rs of the company.

n regard to the merits of the matter, struck Mr. Hedley that the bus pro-al was a repetition of efforts which re made by Chicago interests about years ago, when applications were de for routes not much unlike the sent routes. He says that at that e after hearings extending through ny months, the policy of the city s definitely laid down against further nchises for bus operation. Since then temporary permits, or short-time franchises, only have been granted by the authorities.

Mr. Hedley said in part:

At the hearing ten years ago the Interborough's position was stated, and that was that it was not advisable to grant further franchises. The Interborough Company did not then, nor does it now, take any "dog-in-the-manger policy." It is ready today to co-operate with the public authorities to arrange for the bus operation in such localities as may be necessary to serve the public in connection with the city-owned subways.

About thirty years ago the City of New York embarked upon a policy of putting transportation underground to prevent the even then increasing congestion in the city's streets.

Ten years ago, at the hearings mentioned statistics were laid before the city authorities of the terrible accidents in the streets of London and Paris and the intolerable congestion of traffic movement due to the omnibus operation in those cities. It was found in London that the omnibus was ruining the transportation lines owned by the City of London. The Underground Companies, as they are called in London, had to buy them in order to get them rerouted to avoid unfair and ruinous competition and to relieve street traffic congestion.

It was stated to the city authorities ten years ago, on behalf of the Interborough: "We are not in the market to buy anything from anybody. We might just as well be understood now. If anybody gets a franchise, the Interborough is not going to be in the market as the London Underground was to take it up. We will stand the competition first."

That is the position of the Interborough Rapid Transit Company today.

Mr. Hedley did say, however, that the business of the Interborough Rapid Transit Company is solely that of furnishing transportation to the people of New York. It is his idea that with present city-owned subway, with extensions wherever bus operation may be necessary, the needs of the people of New York can be met better by bus routes connected with the subway than by any separate service.

## Right of Utility to Advertise Affirmed

The Connecticut State Public Utilities Commission has denied the petition in which the Mayor of Stamford objected to the Stamford Gas & Electric Company's advertising on the ground that the cost of such advertising should be used to reduce the cost of gas to the consumer. It was shown by the company at the hearing that the amounts thus expended were so small that no benefit would accrue to the consumer should the policy of advertising be abandoned. The commission said:

The experience and observation of this commission has been that frequently complaints by patrons in matters relating to utilities are due to the omission of the utility to provide intelligent information. This commission has always advocated a proper amount of publicity on the part of the utilities companies in order that their patrons may be informed, in a general way, as to operating and financial conditions as affecting the rate payers. A fair and frank statement by the utility on controversial questions will assist in maintaining a relationship of good will and co-operation between the company and its patrons.

## Proposes Loop Use

### Cincinnati & Dayton Wants to Bring Its Cars Into Cincinnati—Solution of Loop Problem Advanced

A proposition to make immediate use of the Cincinnati, Ohio, rapid transit loop has been presented to the Rapid Transit Commission by Judge Wade Cushing, Presiding Judge of the Court of Appeals. His letter sets forth a proposal made by the Cincinnati & Dayton Traction Company seeking the right to use the loop from its traction terminal, so as to bring its cars down to the subway station at the Canal Boulevard and Vine Street.

Judge Cushing explained that the Cincinnati & Dayton was in the hands of George Sohngen, Hamilton, as receiver, and that Mr. Sohngen wrote to the court recently, stating that it would be a great advantage if the company could use the loop to bring its cars into the heart of Cincinnati.

The court saw in this an opportunity for the Rapid Transit Commission and the city to solve immediately a part of the problem of what eventually is to be done with the loop, and referred the matter to the Rapid Transit Commission.

From the explanation set forth by Judge Cushing, it will be seen that the Cincinnati & Dayton Traction Company contemplates an elevated line from a point west of the Baltimore & Ohio Railroad tracks to reach the loop, thereby doing away with the grade crossing of the railroad at Spring Grove Avenue.

The Cincinnati & Dayton Traction Company controls and operates the traction line between Spring Grove Avenue and Dayton and also the electric railway system in Hamilton. In 1920 a case was tried in the Court of Common Pleas of Butler County involving the foreclosure of numerous mortgages on the property, their sale and a distribution of the money received from such sale. The case was appealed to the Court of Appeals on Jan. 3, 1923. The appeal brought with it the receiver appointed by the court below and imposed the duty of managing the property until distribution. The receiver has greatly improved the physical condition of the interurban properties under his control as well as the Hamilton city lines. The business of the road has been such that whereas it previously showed a loss of about $60,000 a year it now shows a profit of from $60,000 to $75,000 a year.

Mr. Schngen also contemplates putting on two and three-car limited trains between Cincinnati and Dayton. One of these cars will be a chair car. He estimates that such service would greatly increase the travel on the road.

## Community Life Altered

### Los Angeles, Compelled to Cut Use of Current, Fully Realizes Value of Utility Services

Out where the West begins and ends —Los Angeles, of course—small boys are breathlessly awaiting an official ban on the use of water for bathing purposes, with special restrictions on washing neck and ears. They crave to lend their help in the water shortage crisis which confronts southern California.

It's a good water shortage, as water shortages go. Los Angeles believes in doing things in a superlative fashion, and the water shortage is handsomely accomplished. More lives are affected, more property endangered, a greater volume of business concerned than in any previous drought. It is, after all, a very serious matter, but like many other serious matters it is not without some humorous aspects.

In the pardonable pride which swells the heart of Los Angeles, hardships and hindrances are lost. In all the weeks that one observer has ridden the street cars he never heard a complaint about the temperamental skip-stop system, albeit it has forced girth control on 50 per cent of the railways' patrons.

The skip-stop plan was invoked early this summer to save power. To the laity it appears to be well named, for to the man accustomed to finding his particular car at any time and at any place it now seems that the cars stop at certain blocks and skip others, say, on Monday, Wednesday and Friday of each week, and on Tuesday and Thursday reserve the right to stop where they will, running according to schedule only on Saturday. It probably never has happened that a motorman, contented to stop at certain blocks on his outbound trip, has become morose with the monotony of it all, and stopped at a different set of blocks on his incoming trip. But to the observer the thought of this as a possibility appears always to be lurking in the car rider's subconscious mind.

As might be expected in the circumstances, sundry orders have been issued to the local railways by the police, the local board of public utility commissioners, and the State Railroad Commission. At one stage of the game a rider who is statistically inclined thought he had made some headway in regard to his interpretation of official pronunciamentos. He checked the first car that passed, but before the next one arrived the public utilities board had heard that another mountain stream had dried up in the last hour, and the next car skipped the charted point, stopped three blocks down the street, shooting the theory into a cocked hat.

Power conservation is as sensitive to rumors like that as the stock exchange is to a storm in Nebraska. But nobody seems to mind it all. It's probably Los Angeles pride. Why, late one night the writer had to walk home because the cars had stopped running, though it was a fairly decent hour for movie stars and night newspaper workers to be up and doing. The distance was nearly twice as far as one would have to walk for a Camel. But people don't complain.

Walking at night, after certain hours, is not however, entirely a thing of joy. The streets are dark, for all lights are turned off, with exception of one lamp at each corner of street intersections. The city, in fact, seems not unlike a medieval town. No gigantic displays flare against the sky. Automobile dealers must depend on the sales ability alone; a dyspeptic public is left to grope in the dark for its after-dinner chewing gum, unguided by the wriggling antics of electric arrow midgets; hostelries sit in dignified darkness, no longer welcoming the stranger with a flaunting sign flirting at the sky; service stations dispense oil and gasoline in a subdued glow where once was blatant light. Theater sign boards are lighted only from sundown to 9.30 p.m. and then with low-power lamps.

A dash of the ridiculous saves the situation from becoming morbidly serious. Shop windows are allowed to use sufficient, though not full, power to display the latest fall importations. M'lady's vanity won out, and window shopping is still an allowable pastime. Ten chances to one the president of the local board of public utilities, went to the meeting primed by his wife. One can see him rise, with all the dignity of the Governor of North Carolina when he spoke to the Governor of South Carolina, as he says, bowing to the ladies: "Gentlemen, it's a long time between showers."

## Virginia Commission Refuses to Lift Paving Amendment

The State Corporation Commission of Virginia has refused to amend the charter of the Norfolk Railway & Light Company so as to relieve the company of the obligation of paving between tracks imposed in the original charter granted by the Legislature.

In a brief sustaining its petition the railway argued that the commission has no right to refuse to grant an amendment to a charter when it is drawn in the form prescribed by law. The company held that this duty is ministerial only and that the commission has no discretionary powers beyond seeing that the law is complied with.

In refusing to grant the amendment the commission took the position that it has the power to refuse any application for a charter or an amendment to a charter when it is clearly shown that such application is contrary to public policy. The application in question, it was held, is contrary to public policy.

In a case decided in Portsmouth the commission has shown that the question of relieving electric railways of the obligation of paving between car tracks is one which may properly be considered and decided on its merits. In the Portsmouth case the commission granted the petition of the Virginia Railway & Power Company to be relieved from this duty. The case just decided is said to be entirely different, however, the Norfolk company demanding the charter amendment as a matter of right and denying the right of the commission to refuse it.

The petition was filed on July 24. Both the city and the company were quick to file briefs.

## Transit Measure to Voter

### Charter Amendment Proposed at D troit to Permit City to Carry Out Rapid Transit Program

A proposed amendment to the D troit City Charter has been introduc into the City Council. It provides ternate means of financing the co struction of a rapid transit system a establishing a commission to supervi the work. In the Council there was long drawn-out discussion, particula regarding the question of control the rapid transit system when co pleted. It was then voted to introdu the bill carrying the amendment. consequence the measure will lie on t table twenty days before final vote taken to determine whether the amer ment will go into the ballot at the p maries on Sept. 9. It is expected th the amendment will receive a favorab vote. According to Sidney D. Wald chairman of the temporary commissi appointed by former Mayor Jam Couzens to make plans for rapid tra sit, the commission will have a plan routes ready for a vote at the spri election next year if the amendme carries this fall.

#### Operation By Commission Suggest

The recommendations of the Tran Commission include operation of t system by the commission during t construction period. While the co mission believes in unified control of transportation units of the city, oper tion by the commission was includ to guard against the possibility of control in case the city failed to na an operating organization.

It is cited that it would probably five years before any part of the rap transit system can be placed in oper tion. Before then the city may ta over the operation of a bus system, agreement may be reached on a meti politan area covering transportation i the entire district surrounding Detro In either case the city might deci to do away with both the Rapid Tran Commission and the Street Railw Commission and place the transport tion systems under one body. It h been suggested by Ross Schram, ge eral manager of the D.S.R., that ma economies could be effected during co struction if it were understood that t D. S. R. was to have final control. M Schram pointed out that by 1931, pr vided present progress is maintaine the D.S.R. will own an unencumber system.

Relieved of the burden of maki periodical payments for the lines whi it is taking over from the Detro United Railway the city will then ha $3,000,000 to $4,000,000 which might used to provide rapid transit equipme

#### Control With Commission

As indicated previously the comm sion is to supervise, manage and co trol all the routes approved by t people in respect to construction, mai tenance and operation during the co struction period. The routes or a part of them are to be placed in servi as soon as practicable and operated the commission or by such other a thority as may be designated by t city authorities.

## ecision Authorizing Competitive Bus Service Will Be Appealed

The Washington-Virginia Railway l appeal from the decision of the ate Corporation Commission of Vir- ia in awarding a certificate to the exandria Motorbus Company to oper- its line from Alexandria to Wash- ton in competition with the railway. e commission had the matter before for more than a year. It appears t some time ago a permit was issued operate the bus line. The bus com- ny, however, did not receive it and, der the impression that authority d been denied to it, the company andoned the line temporarily. Later, discovering that the certificate had en awarded, the bus line asked for a aring in the matter, and this was anted. In the meantime, the bus line, quired by private parties, was being erated. The electric railway con- ded that the commission had ex- ded its authority after the line had en abandoned in allowing a resump- n of business. In the opinion in the e, the commission held that the bus e is a common carrier, that it has the ial rights to sell, buy, lease or oper- , that private persons have the right acquire such common carriers, and t the owner of the line is well hin his rights to operate the line so g as he complies with the law per- ning to common carriers.

## ledo Headed for Ten-Cent Fare

Toledo now faces the prospect of a -cent cash fare. On Sunday, Aug. 17, fare became 8 cents cash with five kets for 40 cents. This was the sec- d increase by the Community Trac- n Company in the last few weeks. other increase to 9 cents cash and ee tickets for 25 cents will be effect- on Aug. 31. Then in ten days it expected the next higher rate of fare l be enforced. According to Com- ssioner Graumlich this will be 10 nts cash and three tickets for 25 nts. A transfer rate of 1 cent is by the Milner ordinance.

Under the present 8-cent fare the eipts per revenue passenger are out 6.6 cents owing to the large pro- tion of transfer passengers.

The stabilizing fund is now in "red" ures about $30,000, and the company finding it difficult to obtain capital essary for extensions and better- nts.

It is estimated that the 10-cent cash e with three tickets for a quarter l save the company $700 in the item counting pennies and aid the one- n car operations greatly. More one- n cars are expected to be in oper- on within a few weeks.

## Donational Bus Line Seeks Permit in Southern California

The Culver City-Palms Community national Bus Lines, now operating ween Los Angeles and Venice applied to the State Railroad mmission for a permit to act as a mmon carrier. It is said that this ion is based on the complaint of the ific Electric Railway in filing com- int with the State Railroad Commission against the Community Bus Line operating between Los Angeles and Venice.

For some time the Culver City-Palms buses have been running on the "honor system," whereby passengers paid a fare if they felt so inclined and as much as they liked. A contribution box is opposite each seat in the buses. The community bus line asks the Commission to authorize it to operate in competition with the Pacific Electric interurban trains. The fares to be charged are as follows:

From the end of Los Angeles Railway car line in Los Angeles to Culver City and Palms, 10 cents each way.

From Culver City and Palms to the beach at Venice, 15 cents each way.

From end of Los Angeles Railway line in Los Angeles to Venice, 25 cents one way, 40 cents round trip.

## Santa Monica Bus in Operation

The Pacific Electric Railway, Los Angeles, Calif., placed a new bus line in operation on Aug. 4 in territory heretofore unserved. The new line is known as the Pico Boulevard line. It extends from the terminus of the company's local line in Los Angeles at Vineyard Junction to the company's station at Utah Avenue in Santa Monica. The distance of the new bus line between Los Angeles and the beach city of Santa Monica is 10.7 miles. The city of Santa Monica is also served by the company's electric interurban lines, but over two other separate routes.

Twenty-nine passenger coaches of the latest improved design were entered in the new service. An adjunct to this service was also established in the nature of motor coach shuttle service between the Pico Boulevard route and Sawtelle. Transfers are issued from the buses to the railway in local service in the Santa Monica Bay District.

The Pacific Electric Railway now has 140 motor coaches in operation. Thirty-six are used on lines of the Los Angeles Motorbus Company, of which it is joint owner with the Los Angeles Railway, and 104 are in local and interurban service.

## President Barnes Says Buses in Louisville Are Unprofitable

Operation of regular bus routes in Louisville by the Kentucky Carriers, a subsidiary of the Louisville Railway, has not proved profitable. J. P. Barnes, president of both companies, announced a few days ago that the company was losing about $3,000 a month with its bus line. He said the company was figuring on plans to take the route out of the East end, and run it into the West end, a more thickly settled territory. There have been times when the company could have placed its buses in service to the race track, ball park, or other amusement feature, but it has kept the vehicles on regular routes at all times and apparently worked diligently to build profitable business. It is hoped that a line can be established to the West End that will at least break even. There is a 10-cent fare on the buses, without transfers, compared with a 6-cent cash fare, with transfers on the street cars.

## Rules Ottawa Electric Company Must Have Bus License

The Ottawa Electric Railway, Ottawa, Can., was recently found guilty of operating buses without having obtained a license in the town of Eastview, and taking on and discharging passengers within the limits of the municipality. The town of Eastview had passed a by-law licensing and regulating bus traffic in the city limits. The court ruled that the town had authority to do this. After the decision of the court the railway applied to the Eastview police chief for a license to operate its bus line. F. D. Burpee, general manager of the Ottawa Electric Railway, announced that pending the granting of the license the company had withdrawn its buses from passenger service.

Some time ago the Ottawa Electric Railway had the Ottawa Council pass a by-law forbidding any bus lines from picking up and discharging passengers on the same trip within the city of Ottawa. However, the town of Eastview got behind the bus company operating for a 5-cent fare from post office in Ottawa out through the town of Eastview to Notre Dame Cemetery, ½ mile east of the town's limits, and has obtained a franchise from the Ontario government covering this route. This stopped the Ottawa Electric Railway buses, which operated from the eastern limits of Ottawa, from running further than the eastern limits of Eastview.

The town of Eastview, in the first place, wanted the Ottawa Electric Railway to extend its rails through its municipality, but the railway wanted a straight 5-cent fare, while the town demanded a 5-cent fare throughout the railway system to and in Ottawa. The railway's activities in Eastwood have been referred to previously.

## Jitneys Quit in Akron After Six Months' Struggle

Abandonment of all city jitney lines which have operated in Akron, Ohio, for the last six years takes place this week. Following the re-routing of the jitneys so as to take them off the streets over which the Northern Ohio Traction & Light Company operates railway lines, the jitneys failed to make a living. At a meeting of the Jitney Association members with city officials on Aug. 18, the jitney men asked to be permitted to compete along the lines of the street railway's electric and bus routes. The city refused and the jitney men voted to give up the struggle and divide a $23,000 fund which they had accumulated under the city jitney ordinance for bonding purposes. Jitney men were informed by the city they must comply with all terms of the city ordinances or get out of business within forty-eight hours. They immediately decided to get out.

**Bus Line Suggested for Greenville.**— Instead of extending its railway lines, the Southern Public Utilities Company, Greenville, S. C., is seeking the cooperation of that city in a move to start bus lines.

## Wants Estimate of Income on Eight-cent Fare in Springfield

Opponents of the proposed fare increase from 7 to 10 cents on the lines of the Springfield Street Railway, Springfield, Mass., at hearings conducted by the State Public Utilities Commission in Springfield, on Aug. 18, succeeded in having the commission ask the company for estimates of its annual income based on an 8-cent fare for the six months' period from January to June, 1924, instead of on the patronage for the year 1923. The commission also declined to permit the use of an independent audit of the company's finances, made at the direction of the Springfield Chamber of Commerce and paid for by the railway.

Opponents of the fare increase lost their appeal for a six months' delay of the hearing to permit further audit of the company's finances. The commission directed that the 8-cent fare income estimates be presented at a further hearing in the State House in Boston, on Aug. 20. The operating expenses of the company have been greatly increased recently by an arbitration decision granting increased wages to its employees. This is one of the principal reasons for the application for a fare raise.

## Senator Lacey Pardoned

Robert C. Lacey of Buffalo, former State Senator, who pleaded guilty in Federal Court to perjury in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line interurban train on the International Railway in the 1922 strike of platform employees, has been pardoned by President Coolidge. The pardon restores Lacey's citizenship rights, the privilege to vote and hold public office. He is a candidate for re-election this fall. Lacey was fined $500 and sentenced to one day in jail.

Buffalo newspapers express amazement that the President granted a pardon to Lacey after his alleged participation in the dynamite conspiracy outrage. The *Evening News*, after reviewing the case and pointing out that Lacey is a confessed perjurer, says:

> Now, seeking election and vindication, he (Lacey) will be able to point to the President's action as giving him a clean bill of health. Neither politically nor morally does the President's action appear to be justified.

The *Express* says editorially:

> It is not Lacey's time for reappearing. Let him go away back and sit down until his offense has been outlived.

## Subway Program of New York City Administration Revealed

John H. Delaney, head of Mayor Hylan's new Board of Transportation in New York City, made public for the first time in an interview on Aug. 16 the city's plans for new subway construction to help bring about a solution of the transit problem. The three outstanding conclusions that appear to dominate the policies of the Hylan regime have been summarized as follows:

1. There is no intention to sanction an increase over the present 5-cent fare, at least for seven or eight years.
2. It is the purpose of the Board of Transportation, reflecting the fixed views of the Mayor, while pressing subway construction on the limited funds available, to continue to center its efforts on obtaining a constitutional amendment authorizing the issuance of $275,000,000 in subway bonds to replace the new self-sustaining water bonds.
3. The program is to complete as speedily as possible the Fourteenth Street-Eastern District line, to defer work on the Nassau Street line, and to begin construction of the city's independent system, which later may or may not be linked with existing subways under municipal operation.

Mr. Delaney expects the study of the route to be followed by the projected independent system will be well advanced within about two months. The new system, roughly speaking, is expected to comprise:

A line from Washington Heights, or 173d Street, to the lower part of the city, running under Central Park West and through Sixth or Eighth Avenue from Fifty-ninth Street south.

A line from near the Brooklyn end of the Brooklyn Bridge through the central part of Brooklyn and over to Greenpoint or, perhaps, Long Island City, Queens.

A line from Jamaica, L. I., to connect with the Manhattan-Bronx trunk line.

A suitable connection with the passenger and freight tunnel now being built to connect Staten Island with South Brooklyn with a line through Brooklyn to Manhattan.

G. M. Dahl, chairman of the executive committee of the Brooklyn-Manhattan Transit Corporation, has taken issue with Mr. Delaney over the need for the Nassau Street line.

## Municipal Road an Object of Charity

The butcher, the baker and the candlestick maker of the town of Lincoln, Ill., have set aside a day to devote to the municipal railway, which is now nearing the rocks.

At least $2,000 is needed for repairs to the system, and public-spirited citizens are to devote one day to selling tickets on the cars. The merchants have promised to man the cars, collect fares and endeavor to sell a supply of tickets to the riders. The fund accumulated during the course of the day, it is hoped, will be sufficient for the repairs.

The fare, which has been a nickel, will also be boosted to a dime for the one day. Contributions will also be asked to supplement the fund being raised for the street-car lines.

## Bus Service Starts in Decatur

Bus service was started in Decatur, Ill., on Aug. 1 by the Illinois Power & Light Corporation, following a period of great stress and subsequent effort to install a bus-railway service. On the first day, 7,501 passengers were handled by the buses. On the five lines, with eleven buses in operation, 885 transfers were picked up by patrons who started their ride on the trolley cars. All told, more than 20,000 persons rode upon the trolley cars and buses during the first day.

The bus had its beginning in Decatur, about four years ago when the railway's request for an increase in fare was refused. At that time bus service was started by John Borden. Others were quick to enter the field. Duplication of service and confusion followed. As a result of surveys made by traffic experts, the railway decided to install a car-bus service. Following out this idea it bought up the competing bus lines, junked much of the old equipment and substituted a number of Mack cars. The fare on the troll and buses is 6 cents with transf from one to another.

## "Main Thoroughfares" in Youn town to Be Observed

The new traffic code for Youn town, Ohio will soon be put into fo Certain streets are designated as m thoroughfares. Over these stre traffic will have the right-of-way, w traffic in the intersecting streets be required to come to a full stop fore proceeding into the main thorou fare. Under the law all streets which railway cars operate are c sidered main thoroughfares. Ot streets have also been designated m thoroughfares by the ordinance enac by the City Council. The Pennsylva Ohio *Electric News*, the offi pamphlet of the Youngstown Munic Railway, says that the conferring the right-of-way on vehicles in main thoroughfares does not mean t these vehicles can disregard vehi coming off of side streets; that th is still in the city ordinance a cla which says cars must operate un control while approaching intersectio further, Section 13 states that the c must be provided with a signal bel gong and that this must be sounded least 100 ft. distance from all st intersections and continually w passing such intersections.

## Wage Arbitration in Boston Under Way

Public arbitration hearings have b started at Boston to determine w the wages for the uniformed emp ees, the platform men, of the Bos Electric Railway shall be during next twelve months. The special a tration board has held three sessi and has taken some evidence from ward Dana, the general manager the company, and has heard an open statement from James H. Vahey behalf of the men. Although a m ber of the arbitration board Mr. Va is conducting the men's case as t counsel. The counsel for the Bos Elevated is H. Ware Barnum.

It developed that it was the Eleva which first gave notice of a desire change the present schedule of wa That company asked the men to acc a reduction of 5 cents an hour, w would make the maximum rate 60 c an hour. The Amalgamated then lowed with demands much larger t had been generally supposed. In matter of pay the union asked for increase of 20 cents an hour. Besi this the new demands of the men for free uniforms, free transporta at all times by means of ticket bo to be issued to them; two weeks va tion with pay and double pay for overtime. The men also want an crease in the allowance for meals w the trip takes them to some point fr which they cannot get back to t usual places for luncheon. They getting 65 cents under the old ag ment and they want 85 cents. A the opening sessions the hearings w adjourned for a week. It will proba be several weeks before there is a d sion.

## Railways Advertise Their Own Bus Proposals

Both the Third Avenue Railway, ew York, and the Brooklyn-Manttan Transit Corporation, Brooklyn, e advertising in their cars the fact their willingness to supplement serv- e on their railway lines with bus eders. The placard of the Third venue contrasts the proposal of that mpany with the one advanced by the fth Avenue Coach Company for erating rights on the Grand Conurse. No transfers are proposed in e offer of the coach company, while e railway proposes transfer from s to bus and transfer from bus to ilway.

The placard of the Brooklyn company ustrates at the top the type of uble-deck bus which the company ntemplates putting into service. The uestion that the company asks is: Where do you need buses?" The acard then says:

"B.M.T. buses—ten double deck, seatg sixty-seven each, and two singleck, seating twenty-nine each, are ady for service. We have petitioned e Board of Estimate for bus franises. Write for copy of letter."

The letter referred to is the prosal made by Chairman Dahl to the y, in which he reviewed the situaon at length.

## News Notes

**Athens to Quit the Pass.**—The thens Railway & Electric Company, thens, Ga., at an early date will dis- ntinue the pass system that has been use for several months. The pass as been sold for $1.

**Wants Jitneys Curbed.**—Thirty emloyees of the Worcester Consolidated treet Railway, Worcester, Mass., re- ntly appeared before the Selectmen Clinton, Mass., and demanded that e board take some action to stop tneys from sniping prospective railay passengers. They expressed the ear that if the tactics of the jitney en were not curbed the Consolidated ould suspend operation of cars on the eominster to Clinton and Hudson to linton lines. The Selectmen expressed e desire to have the cars continue service.

**Subway Hearing Postponed.** — Heargs on the applications of the Highway ommission to construct subways in orth Sacramento, Calif., under the acks of the Sacramento Northern and e Western Pacific have been postoned to Sept. 16. They were set by e Railroad Commission to be held on ug. 22.

**Recommends Buses As Feeders.**— he Public Utilities Bureau of Louisle, Ky., in a recommendation to the oard of Public Works, has suggested at bus lines be established as feeders, extensions to some of the local railay lines. The recommendations favor e bus lines to be operated in conjuncon with the street cars, and on the same fare rate, with transfers to cars at terminals, and from these cars to intersecting lines. The bureau agrees in part with the contention of the railway that costs of extension of rails is prohibitive.

**Will Change to One-Man Operation.**—The Linwood Street Railway, which operates between Whitinsville and Linwood, Mass., will operate each of its two cars with one man as soon as practicable. The line is about 2 miles long. It is owned by officials of the Whitins Machine Works. It is used also as a freight road.

**Will Serve as Belt Line for Switching Freight.**—The Tacoma Municipal Railway may become a belt line road for the switching of all freight cars to and from tideflat industrial plants. Contracts looking toward this end have been signed by each of the four transcontinental railroads and submitted to the City Council. The proposal will be examined by the city attorney. The contracts are the result of a year's work on the part of the secretary of the traffic and transportation bureau of the Chamber of Commerce. A digest of the prospective freight business of the municipal line shows that its use as a belt line will probably increase municipal carline earnings by $25,000 a year. This increase will go a long way toward making the road self-sustaining.

**Trouble Caused by Jitneys.** — Allen McReynolds, attorney for the Southwest Missouri Railroad, Joplin, Mo., recently told the Joplin City Commission that if jitneys were eliminated the railway could be operated at a profit. Losses of the company in operating its city lines in Joplin for the last tenmonths' period exceeded $50,000. Four of the five city lines were operated at a total loss of $54,873. One line made $4,352.

**Will Co-operate for Crossing Elimination.**—The State Highway Commission of Kentucky has announced that plans have been started for the elimination of a double grade crossing near Simpsonville, Ky., on the Shelbyville-Frankfort-Lexington and Louisville pike. The intention is to put in either an underpass or overpass, carrying the Louisville & Nashville Railroad steam tracks and Louisville & Interurban traction lines.

**Company Sues—Counter Suit Filed.**—The Virginia Railway & Power Company is suing a woman patron for 14 cents for transportation fees in Norfolk for her son, who is alleged by the company to be six years old and not entitled to ride free. The boy's mother has countersued. She is asking for $10,000 because of humiliation caused by an "uncivil" conductor who claimed her son was more than four years and therefore not exempt from fare collection. In Civil Justice Court the company took a non-suit on Aug. 11. Motion for a continuance on the grounds that a material witness was out of the city was overruled. The attorney for the railway said his company would take a non-suit in order that another suit might be brought upon his witness' return.

**Railway Man on Motor Vehicle Committee.** — L. H. Palmer, vice-president and general manager of the United Railways & Electric Company, Baltimore, Md., has been appointed by Secretary of Commerce Herbert Hoover to serve on the committee on motor vehicles which will make an exhaustive study prior to the national conference on Street and Highway Safety, scheduled for some time in the fall. Mr. Palmer will work under the chairmanship of H. M. Crane, president of the Society of Automotive Engineers. Some time ago Secretary of Commerce Hoover was asked to lend his efforts toward organizing a national conference on the subject of street and highway safety. Mr. Hoover has suggested that the conference should be preceded by exhaustive investigation into the different phases of the problem and so various committees have been formed to deal with the particular issues.

**Trackless Trolley Petition in September.**—A hearing on the petition of the Capitol District Transportation Company for certificates to operate trackless trolleys in Cohoes and buses in Rensselaer, will take place at the office of the Public Service Commission Sept. 9. Ernest Murphy, general manager of the company, said recently that if the certificates are granted, work will go forward rapidly. The Capitol District Transportation Company is a subsidiary of the United Traction Company, Albany, N. Y.

**Awards Announced.**—For attaining a satisfactory record and having performed distinguished service, twelve trainmen of the Birmingham Electric Company, Birmingham, Ala., will receive the 2½-year gold buttons as the award for the first six months of 1924. Fifty-three men will receive the 1½-year silver buttons, ninety-nine men will receive one year silver buttons and 140 men will receive the six months' bronze buttons. The transportation department of the company announces that it appreciates the effort being put forth on the part of these men in handling passengers every day and in discharging the obligations and duties of the work with credit to themselves and the company.

**Binghamton Railway to Supplement Service.**—An application for permission to operate buses in Johnson City will soon be made to the Public Service Commission by the Binghamton Railway, Binghamton, N. Y. It is planned to operate under the name of the Binghamton Auto Bus Lines, Inc., with the same officers as the railway company. Service will commence on Sept. 1 with two Mack buses. A franchise has already been granted by the board of trustees of Johnson City.

**New Franchise Granted at Laurel.**—Electors of the city of Laurel, Miss., have approved a new franchise to the Laurel Light & Railway Company. The new grant will make it possible for the company to make a bond issue of $100,000. About $60,000 will be used to enlarge the power plant, doubling its present capacity, $20,000 will be spent on the distribution system and a like amount in improvements in the railway department. The period of the new franchise is twenty-five years.

**Bus Purchase Bill Passed by Georgia Legislature.**—By vote of 131 to 5 the Georgia House has passed a bill authorizing electric railways to acquire stock in bus lines. This bill passed the Senate and will go to the Governor for his signature. The measure permits railways to purchase stock in bus lines to enable the railways to extend service through the operation of the buses as feeders.

**Denies Reports on Purchase.**—A. H. Schoellkopf, vice-president of the Niagara Falls Power Company, Niagara Falls, N. Y., has denied reports that his company is seeking to purchase the franchise, right-of-way, equipment, etc., of the Niagara Gorge Railway. The railway operates a belt line route down the Canadian gorge and up through the lower American gorge of the Niagara River, the Canadian half of the trip being made over the Park & River division of the International Railway, Buffalo. The power company was said to be seeking control of the railway to secure power rights in the lower gorge owned by the railway.

**Double Stops Eliminated in Mobile.**—The Mobile Light & Railroad Company, Mobile, Ala., in co-operation with the officials of the police department in attempting to relieve traffic congestion in the downtown district, has abandoned all double street car stops.

**Change Sought in Bus Regulatory Legislation.**—Tentative regulatory legislation for approximately 1,000 buses in North Carolina, to be sought at the forthcoming special session of the General Assembly, will place the control of the buses—as common carriers—under the State Department of Revenue instead of the Corporation Commission. Two reasons are offered in support of the proposal that the control be given by the Legislature to the Commissioner of Revenue. One is that by not asking that they be placed under the jurisdiction of the Corporation Commission the objection of Governor Morrison will be removed. The other is that the embarrassment which might come to the commission, in passing upon controversies as to parallel railroad and bus lines, will be obviated by designation of the Commissioner of Revenue as the control.

**Bravery of Starter Recognized.**—Ethington B. Merritt, suburban car starter in the employ of the United Railways & Electric Company, Baltimore, has been presented with a gold watch by the company in recognition of his bravery in frustrating a bandit who attempted to hold up a car. The presentation was made by L. H. Palmer, vice-president and general manager of the company.

**Interurban Division to Have One-Man Cars.**—One-man cars, which now are being used on a large number of local lines of the International Railway in Buffalo and Niagara Falls, will be extended to the Kenmore-Tonawanda interurban division early in September, according to present plans of the company. This will be the first interurban division to operate with one-man cars in western New York. Crews are now being trained for the one-man operation of this division. These cars operate from the Buffalo-Kenmore city line through Delaware Avenue to the Tonawanda-North Tonawanda city line, a distance of about 7 miles.

**Safety Conference in Indiana in September.**—Laws requiring all motor traffic to stop at interurban and railway crossings and prohibiting more than two persons from riding in the front seat of an automobile are suggested by G. O. Nicolai, of the Terre Haute Traction & Terminal Company, to cut down the death toll from automobile accidents. These were made following announcement by the Public Service Commission of a conference in September to promote safety in Indiana.

**New Orleans Public Service, Inc., Extends Bus Auxiliary Service.**—The second line of buses to be established by the New Orleans Public Service, Inc., New Orleans, La., was started Aug. 4. It now operates along Frenchmen Street from Florida Walk, a section of the city as yet too thinly populated to make it profitable for the railway company to extend its lines, and at Decatur Street, its turning point, buses traverse a good portion of the lower part of New Orleans, to Canal Street. The rate of fare charged is the same as that on the street cars—namely 7 cents—with transfer privileges to all intersecting railway lines. In New Orleans, all car stops, both for boarding and discharging passengers, are made on the far side of the street, except on streets with intersecting street car lines. An innovation is now proposed in the plan to stop on the near side of the street.

**"Weekly Pass" Time Extended.**—Another lease of life for the $1 weekly pass on the lines of the Tacoma Railway & Power Company, Tacoma, Wash., has been granted by the State Department of Public Works. The date for discontinuing the use of the pass has been advanced to Sept. 14. This puts its operation past the time for the primary election at which the railway desires to submit its proposed new franchise to the people. The Tacoma property is asking citizens to petition the City Council to place the new franchise proposals on the primary ballot. The company is seeking to do away with paving, gross earnings tax and other requirements. As part of its franchise proposal the company has suggested that the use of the weekly pass be extended for at least a year. It would also agree to install service with buses at the request of the City Council.

**Advertising Contracts Not Renewable.**—The Public Service Transportation Company, a subsidiary of the Public Service Railway, won a victory in the Court of Chancery when Chancellor Walker refused to modify a decree of Vice Chancellor Foster respecting advertising in motor buses acquired by the company from independent operators. The Schindler Advertising Company has contracts with former jitney men for display advertising. Now that the Public Service is acquiring buses of independent operators the advertising contracts are good until the time limit for them expires. The contracts are not renewable.

# Foreign News

## Berlin Elevated & Underground Railways

A reminder of the fluctuations durin 1923 of the German mark is shown in the annual report of the Berlin E vated & Underground Railway, recen issued. Americans have had some dif culty in raising rates with a depreciat currency, but they have not been oblig to raise the fare per passenger from cents to $130,000,000, which is pra tically at the rate of increase wh was made on the Berlin Elevated & U derground Railway during 1923. Und such circumstances, figures on gro and net receipts do not mean much, this article will be confined largely statistics other than financial.

During the year two extensions we put in service on what is known as t North-South Railway operating a proximately at right angles to the o line which ran East and West. Anothe section of the North-South line wa opened April 19, 1924. The equipmen of the company includes 440 cars, whic during the year made 5,362,696 trai kilometers, with trains up to six car each. Besides its elevated and under ground lines, the company operates short trolley extension to the East, wit twelve motor cars and nine trail car

PASSENGERS CARRIED AND AVERAGE FAR CHARGED, BERLIN ELEVATED & UNDER GROUND RAILWAY, 1923

| Month | Number of Passengers | Average Fa per Passeng in Marks |
|---|---|---|
| January | 12,812,562 | |
| February | 13,905,870 | 1( |
| March | 14,291,894 | 1: |
| April | 13,887,919 | 2. |
| May | 13,657,837 | 2 |
| June | 14,977,437 | 4( |
| July | 14,860,280 | 1,5 |
| August | 13,460,053 | 28,5 |
| September | 15,506,580 | 982,7 |
| October | 13,990,201 | 239,906,0( |
| November | 12,237,895 | 56,082,000,0( |
| December | 13,958,480 | 130,133,000,0( |

## Mr. Dalrymple's Views on Tramway Situation

James Dalrymple, general manage Glasgow Corporation Tramways, pre sented a paper on municipal tramwa administration at the annual meetin of the Institute of Public Administra tion in Oxford July 21. He outline the Glasgow system of management which had enabled repayment of th entire sinking fund in 1917, sixtee years after electrification of the tram ways, and carry on through the difficul period following the war with little in convenience. A number of smalle British municipal tramway undertak ings were operating at a loss, he saic largely due to motor bus competition The buses, unlike tramways, pay n rates to the cities and are not re quired to keep up a regular service but simply take the cream of the traf fic. It is Mr. Dalrymple's opinion how ever, that when normal trade in th country is restored the tramways wil earn sufficient revenue to make both ends meet.

# Financial and Corporate

## nfortunate Conditions in Mexico City Cause Slump in Earnings

The Mexico Tramways, Mexico City, exico, for the year ended Dec. 31, 23, realized net earnings (Mexican rrency) of $1,146,049 after allowing r taxes and depreciation. This com- res with net earnings of $2,097,918 in e preceding year. The gross earn- gs in 1923 were $12,266,830, against 2,942,417 in 1922. The total number passengers carried on the Mexico amways in 1923 was 103,083,773; in 22 the number was 109,286,678. The tal car-miles operated was 17,371,229 st year and 16,093,889 in 1922. In e report to the president and direct- s of the Mexico Tramways, G. R. G. nway, managing director, states that e year's results proved very unsat- factory due to labor difficulties in the onths of January and February, jit- y competition and the general busi- ss depression during the latter part the year. The poor showing was so partially due to the uprising ainst the government in December. For experimental purposes the com- ny has established an omnibus serv- e from the center of the city to a sidential district and also a suburban rvice. The total number of single- ck type buses in daily operation is velve during the week and thirteen Sundays. Much opposition to this rvice was experienced from the vners of the jitneys and many diffi- lties arose in trying to obtain satis- ctory routes for their operation. But view of the fact that the buses, up the present, have not been allowed run into the downtown business dis- ict, they have not so far been able compete with the jitneys.

During the year the company made rtain changes in its rolling stock and acks in order to adopt single-end eration of the cars so as to introduce re boxes and the "pay-as-you-pass" stem.

## ease of Interurban Company's Tracks Solves Indianapolis Problem

A tentative lease by the Indianapolis reet Railway of the tracks of the nion Traction Company of Indiana om Forty-sixth Street, Indianapolis, rth on College Avenue to Broad pple has been signed. The lease ll be submitted immediately to the blic Service Commission for ap- oval. Until then the terms will not made public. The Union Traction mpany will continue to operate its terurban cars over the College Ave- e tracks, but it is understood it will continue its service to Broad Ripple. der the Public Service Commission der of April 18, the Indianapolis com- ny was directed to extend its service Broad Ripple by Sept. 1. The rate on e Union Traction cars from Broad pple to the city is 10 cents, with a 7-cent fare or a city street car ticket for a ride wholly south of Fifty-fourth Street; 5 cents between Fifty-fourth Street and the north limit of the line. Under the city company's service there will be a 7-cent fare from Broad Ripple to Indianapolis.

## New Officers Elected for Indiana Interurban

The Indiana Service Corporation, Fort Wayne, Ind., will assume active operation of the Fort Wayne & Northwestern Railway, and a merger is expected to be completed within sixty days, according to announcement made by Robert M. Feustel, president of the Service corporation.

In preparation for the merger a number of changes have been made in the officers and directors of the Fort Wayne & Northwestern Railway. Resignations have become effective as follows:

President, C. J. Munton, Kendallville; first vice-president, William L. Taylor, Indianapolis; second vice-president, J. H. Rose, Fort Wayne; secretary-treasurer, V. R. Shick, Kendallville, and directors, Mr. Munton, Mr. Taylor, Mr. Rose, Raymond H. Smith, New York, and F. Leonard, Fort Wayne.

New officers have been announced as follows:

President, Mr. Feustel; vice-president, H. E. Vordermark, Fort Wayne; secretary-treasurer, F. H. Schmidt, Fort Wayne; general manager, Henry Bucher, Fort Wayne. The board of directors includes the officers and F. M. Tayte and James M. Barrett, Fort Wayne.

## Seeks Abandonment in Wallkill

The Wallkill Transit Company, Middletown, N. Y., has petitioned the Public Service Commission for permission to abandon its rights and franchises in the towns of Wallkill, Goshen and village of Goshen, Orange County. The route proposed to be abandoned is being conducted at a loss of from $30 to $50 a day, the company stated.

The company on June 25 was permitted by the commission at the request of the city administration of Middletown to discontinue railway service in Middletown and substitute a bus service, operated by the Wallkill Public Service Corporation, a subsidiary concern. Since then, the petition sets forth, the company has continued the operation of the line from the city limits to Franklin Square, pending the filing of a petition by the Wallkill Public Service Corporation for consent to operate a bus line over the route from Franklin Square to the city limits and through the towns of Wallkill to Mechanictown and Phillipsburgh.

The petitioner claims that for the past year it has not earned in excess of the amount sufficient to pay the wages of its employees and the price of the coal consumed. Since April conditions have been growing worse.

## Changes in Control and in Officials at Montreal

E. A. Robert resigned recently as president of the Montreal Tramways. Accepted at the same time as Mr. Robert's resignation were also the resignations of J. M. Wilson, George G. Foster and J. M. McIntyre. Elected to fill the vacancies thus created were: Julian C. Smith, Howard Murray, Gordon W. MacDougall, and George Montgomery. Julian C. Smith, vice-president of the Shawinigan Water & Power Company was elected president, replacing Mr. Robert. The board now consists of these four newly-elected directors together with Senator Lorne C. Webster, J. L. Perron, William C. Finley, W. G. Ross and P. J. McIntosh, who is a vice-president of the company.

Another important announcement is that the United Securities, Limited, has secured control of the Montreal Tramways & Power Company through the deposit with the Montreal Trust Company of more than 92,000 shares of the stock of Montreal Tramways & Power Company for exchange into the shares of the United Securities, Limited. It has also been announced that more than 33,000 shares of Quebec-New England Hydro Electric Corporation have been deposited in favor of United Securities, constituting share control of both companies.

The resignation of Mr. Robert after a term of fourteen years as head of Montreal's traction system is the culmination of events which started to come to a head less than three years ago, and resulted in his dropping out of company after company which comprised part of Montreal Tramways & Power Company, the holding company of Montreal Tramways.

## Line Discontinues in Gardner

Directors of the Gardner-Templeton Street Railway, Gardner, Mass., have announced the retirement of Charles Mulhado as president of the road and Ralph Kelly as clerk and treasurer. The company has also announced discontinuance of the Main and South Main Street line and the tracks and overhead equipment will be removed.

The line has been operating only two days a week, Tuesday and Saturday, and the decision to discontinue it entirely was due to lack of patronage. Superintendent Louis Starkey is in charge temporarily with headquarters at the East Templeton carhouse. The company operates in Templeton, East Templeton, Otter River and Baldwinville.

Organization of the company by Mr. Mulhado followed the receiver's sale of the Northern Massachusetts Street Railway properties on Jan. 1.

## Abandonment Allowed on Trenton Line—Buses to Be Substituted

The Board of Public Utility Commissioners has granted the application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to abandon railway service between Pennington and Hopewell and to substitute buses between these points. Approval was also granted to the com-

pany for a through service of buses between Hopewell and Trenton in conjunction with railway service between Trenton and Pennington. The trolley route to be abandoned is a part of the line operated between Trenton and Hopewell. The board also required that the overhead line should be removed from Pennington to Hopewell within three months from Aug. 1 and that within a year from that date the tracks be removed.

The company has pointed out to the New Jersey Board of Public Utility Commissioners that to continue trolley service between the two towns would entail an expenditure of more than $50,000 within the next two years. In ruling on the bus operation, the board required that the bus line be run on a reasonable schedule and that a rate of fare be passed upon after the presentation for approval of local permits.

Petition to operate the proposed bus line from Trenton to Hopewell was later filed with the Trenton City Commission by Rankin Johnson, president of the Central Transportation Company. If the permit is granted bus service will begin on Sept. 1.

---

**Preferred Stock Offered.** — Beyer & Small, Maynard S. Bird & Company and Charles H. Gilman & Company, Portland, Me., are offering at 86 and dividends to yield about 7 per cent $1,000,000 of the 6 per cent cumulative preferred stock of the Cumberland County Power & Light Company, Portland, Me. The company is the largest public utility in the State. It supplies railway service in Portland and vicinity. The proceeds of this issue, as well as the proceeds of the sale of 3,032 shares of common stock will be used to reimburse the company for a portion of the cost of the new addition to the steam plant at Portland.

**Line Ceases to Operate.**—The Montoursville Passenger Railway, Williamsport, Pa., running for twenty-seven years, has ceased to operate, being abandoned by the Williamsport Passenger Railway. Traffic over the route will be handled by the Lycoming Auto Transit Company, which operates between Williamsport and Montoursville. The line was 5.5 miles long.

**Cheyenne to Give Up Railway.**—Abandonment and dismantling are now under way in Cheyenne, Wyo., by the Cheyenne Electric Railway. Bus operation was started by W. E. Deneen at the request of the railway on Aug. 16 under a special permit from the city authorities until the hearing before the Public Utilities Commission on Aug. 29. He is operating one Reo bus and two more are en route. The company has been operating at a heavy loss for a number of years, due to many reasons, notably high taxes and a $10,000 paving improvement which the company could not finance. Moreover, the earnings were effected because the line was blocked from running cars downtown while sewer and roadway improvements were under way. The Cheyenne Electric Railway is 5.5 miles long.

**Allowed to Abandon Lines.**—Finding that operation by the Union Traction Company, Santa Cruz, Calif., of its Santa Cruz Laveaga Park and Santa Cruz-Seabright-Capitola lines is not justified by the present and prospective traffic, the California Railroad Commission recently authorized the company to suspend service on these lines and to abandon and remove the tracks. Authority to abandon, however, contains the provision that the traction company substitute bus service for the rail service. In accordance with this provision the commission has granted to the traction company a certificate of convenience and necessity to operate a stage line as a common carrier of passengers between Santa Cruz and Capitola and intermediate points and between Santa Cruz and Twin Lakes and intermediate points.

**Lake Charles Property Sold.**—It is reported that the Eastern Texas Electric Company of Wilmington, Del., has purchased the street railway, electric light, gas and water systems and plants in Lake Charles, La. The company has a capital of $2,500,000 and received authority to sell $1,100,000 of 7 per cent preferred stock. It is a holding company that controls public utilities in Beaumont and Port Arthur, Texas. The purchase is reported to have involved about $1,000,000.

**Seeks to Abandon One Mile Line.**—Permission to discontinue railway service over the East Van Buren line from the Frisco station in Van Buren to t Smelter, has been asked in a petiti filed with the City Council by the F Smith Light & Traction Company, F Smith, Ark. Loss in operation is t reason given. The company asks t right to take up the track.

**Service Resumed by Long Isla Line.**—Service on that portion of t lines of the New York & Long Isla Traction Company on the south side Queens County, which was abandon last Winter, was resumed on Aug. as far west as New York Avenu otherwise known as Jamaica Junctio This is at the point where the li formerly running between Roseda and Grant Avenue, Brooklyn, inte sected with the line running fro Jamaica to Far Rockaway. Service h been given on the south side betwee Freeport and Rosedale. With the r sumption of service from Rosedale New York Avenue transportation electric railway from Freeport, Roc ville Centre, Lynbrook, Valley Strea and Rosedale, to Jamaica on a regul 30-minute headway is in vogue.

**Augusta Notes Extended.**—Director of the Augusta-Aiken Railway & Ele tric Company, Augusta, Ga., have de clared operative the plan for an exte sion to Dec. 1, 1935, of the five-yea notes that were due on June 1 of thi year. In view of the bondholders' ac ceptance of the plan interest on th extended notes will be at the annua rate of 6 per cent instead of 5 per cen as previously. Interest payment i cash on the 5 per cent notes also ha been resumed. Disbursements in cas on this issue were deferred five year ago by funding the coupons for fiv years up to and including the Dec. 1 1923, coupons into interest-bearin notes, all of which came due on June 1 1924. By extending the maturity o these notes to 1935 they will fall du on the same date as the bonds.

**Report on Abandonment Effected.**— The Alabama Public Service Commis sion has taken under advisement the evidence presented to it at the recent hearing on the petition of the Alabama Traction Company for permission to discontinue service in Albany and Decatur. It was brought out that the company was making no money in the operation of cars in the Twin Cities.

| | Latest | Month Ago | Year Ago | Since War High | Since War Low |
|---|---|---|---|---|---|
| **Street Railway Fares*** 1913 = 4.84 | Aug. 1924 **6.99** | July 1924 **6.98** | Aug. 1923 **6.92** | May 1921 **7.24** | May 1923 **6.88** |
| **Street Railway Materials*** 1913 = 100 | July 1924 **155** | June 1924 **158** | July 1923 **169** | Sept. 1920 **247** | Sept. 1921 **156** |
| **Street Railway Wages*** 1913 = 100 | Aug. 1924 **221** | July 1924 **221** | Aug. 1923 **214** | Sept. 1920 **232** | Apr. 1923 **207** |
| **Steel**—Unfilled Orders (Million Tons) 1913 = 5.91 | July 31 1924 **3.19** | June 30 1924 **3.26** | July 31 1923 **5.91** | July 31 1920 **11.12** | July 31 1924 **3.19** |
| **U.S. Bank Clearings** Outside N. Y. City (Billions) | July 1924 **16.24** | June 1924 **15.26** | July 1923 **15.40** | Mar. 1920 **18.54** | Feb. 1922 **10.65** |
| **Business Failures** Number | July 1924 **1,533** | June 1924 **1,561** | July 1923 **1,405** | Jan. 1924 **2,258** | Sept. 1923 **1,279** |
| Liabilities (millions) | **49.18** | **38.05** | **40.22** | **109.1** | **30.83** |

## Conspectus of Indexes for August, 1924

**Compiled for Publication in this Paper by**

**Albert S. Richey**
**Electric Railway Engineer**
**Worcester, Mass.**

| | Latest | Month Ago | Year Ago | Since War High | Since War Low |
|---|---|---|---|---|---|
| **Eng. News-Record** Construction costs 1913 = 100 | Aug. 1924 **213.2** | July 1924 **214.4** | Aug. 1923 **221.5** | June 1920 **273.8** | Mar. 1922 **162.0** |
| **U.S. Bur. Lab. Stat.** Wholesale Commodities 1913 = 100 | July 1924 **147.0** | June 1924 **144.6** | July 1923 **150.6** | May 1920 **247** | Jan. 1922 **138** |
| **Bradstreet's** Wholesale Commodities 1913=9.21 | Aug. 1 1924 **12.62** | July 1 1924 **12.23** | Aug. 1 1923 **12.82** | Feb. 1 1920 **20.87** | June 1 1921 **10.62** |
| **Dun's** Wholesale Commodities 1913 = 120.9 | Aug. 1 1924 **188.0** | July 1 1924 **185.5** | Aug. 1 1923 **186.7** | May 1 1920 **263.3** | July 1 1921 **159.8** |
| **U.S. Bur. Lab. Stat.** Retail food 1913 = 100 | July 1924 **143** | June 1924 **142** | July 1923 **147** | June 1920 **219** | Mar. 1922 **139** |
| **Nat. Ind. Conf. Bd.** Cost of living 1914 = 100 | July 1924 **161.7** | June 1924 **161.7** | July 1923 **161.9** | July 1920 **204.5** | Aug. 1922 **154.5** |

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

**Authority Sought to Abandon Some verside Lines.**—In an application filed th the California Railroad Commis-on on Aug. 11, the Pacific Electric ilway, Los Angeles, asked for au-ority to abandon service and remove e tracks on certain streets in the ty of Riverside. The company says at operation over the rails specified s been conducted at a loss for some me, and that continued operation will quire the expenditure of large sums r reconstruction work which is not stified by the prospective patronage. he lines to which reference has just en made are located on Brockman venue, Fourteenth Street, Myrtle venue, Seventh Avenue and Houghton venue.

**Joint Operating Agreement Reached.** —An agreement has been reached be-ween the Southern Pacific Company nd the Key System Transit Company, akland, Cal., by which the electric rains of both companies will use joint racks on Webster Street in Oakland, ow used by the Key System. This eans the abandonment of the tracks n Franklin Street and the old Franklin treet station, long an object of protest n the part of the city authorities. his station is located in the heart of akland's business section and its re-oval has been repeatedly demanded. he new terminal will be farther down own on Second Street. Several legal bstacles remain to be smoothed out efore the new plan is put into oper-tion, but the State Railroad Commis-ion is expected to aid in hastening he change.

**Line Abandoned.** — The Interstate ublic Service Company is taking up ts Charlestown Avenue tracks in New lbany, Ind., rather than spend $25,000 or new rails in the rebuilding of the treet. The company contended that inancial conditions do not warrant the utlay.

**Ready to Give Up Line.**—The Worces-er Consolidated Street Railway, Worces-er, Mass., has virtually decided to bandon the Worcester to Spencer line ccording to Henry C. Page, general anager, who says that the line will uit just as soon as the legal steps ecessary for abandonment can be aken. The competition of jitneys with he railway between the two places has urt the earnings.

**Railway Line Leased.** — The Wells-urg, Bethany & Washington Railway, Wellsburg, W. Va., has been leased by he Buffalo Collieries Corporation, Scottdale and Monessen, Pa. The deal alls for the option of five years ex-ension, a further option of purchase nd a rental of $10,000 yearly, payable uarterly. Extensive repairs are to be ade in accordance with the terms of he agreement under which the traction ine is taken over. The leasing com-any is to expend $10,000 on improve-ents during the first year and $25,000 year every year thereafter. The easing corporation, known as the Buffalo Valley Railway, is a subsidiary f a large coal company, owning most f the rich coal deposits in the Buffalo reek Section. The deal, it is believed, ill eventually result in the opening f a coal field in the Buffalo Creek istrict near Wellsburg.

# Personal Items

## R. R. Lukens at Covington

Ralston R. Lukens, new superintendent of tracks and structures of the Cincinnati, Newport & Covington Railway, Covington, Ky., comes to that company with many years of practical experience with electric railways throughout the country. For the past five years Mr. Lukens was superintendent of ways and structures of the Pennsylvania-Ohio Electric Company, with headquarters at Youngstown, Ohio. Prior to that he was superintendent of maintenance of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for six years, and before that was connected with the Chicago City Railway, Chicago, Ill., for four years as assistant engineer. Mr. Lukens was born in Philadelphia. He is an engineering graduate of Lehigh University.

R. R. Lukens

Since leaving school he has been identified continucusly with electric railway companies. As superintendent of tracks and structures of the Cincinnati, Newport, & Covington Railway, he has general supervision over properties scattered over half a dozen Northern Kentucky municipalities. Mr. Lukens succeeded W. T. Rossell, who has accepted the position of roadway engineer of the Pittsburgh Railways, Pittsburgh, Pa.

## Railway and Bus Personnel Separated

Grayson M.-P. Murphy, chairman of the executive committee of the Interborough Rapid Transit Company, New York, which operates subway and elevated lines, on Aug. 19 announced his withdrawal from the Interborough entirely and his acceptance of the chairmanship of the board of directors of the Fifth Avenue Coach Company.

Frank Hedley, president of the Interborough, resigned at the same time as a director of the coach company, as did W. Leon Pepperman, vice-president of the Interborough.

Mr. Murphy gave as the reason for his resignation the fact that he believes that the coach company and the Interborough might soon be in active competition. He held at the same time that the development of a comprehensive system of buses was essential to the solution of the present transit situation.

J. B. A. Forsburg, a member of Mr. Murphy's firm, Grayson M.-P. Murphy & Company, was elected a director of the coach company, as was John A. Ritchie, president of the Chicago Motor Coach Company, formerly president of the Fifth Avenue Coach Company.

Incidentally it should be mentioned that a proposal for the extensive operation of new bus lines in New York City was presented to the Board of Estimate on Aug. 20 by the Fifth Avenue Coach Company, now operating the Fifth Avenue buses. It provides for thirty-four new routes in three boroughs, adding 116 miles to the present system of the company. A feaure of the proposal will be provision for the recapture of the new lines by the city. The matter has been laid on the table by the Board of Estimate and probably will not be taken up for action until the meeting on Sept. 26, following the summer adjournment.

**Edward Quincy Brown,** superintendent of transportation of the Jacksonville Traction Company, Jacksonville, Fla., for several years, has been selected by J. P. Ingle, general manager, to fill a new position with the company synonymous with that of commercial manager in most light and power organizations. Mr. Brown's duties will all lead to the same end, that of increasing the business of the traction company by studying the needs and wants of the public and satisfying them as far as possible. His title has not been decided upon, but Mr. Brown will serve in the capacity of a "contact man" between the company and the public. In his new position Mr. Brown will handle all of the company's advertising, edit *Trollicar Topics*, hear complaints, and receive suggestions that are made in the interest of better service. He will also determine what special service the company shall give for the benefit of the public. Mr. Brown has been with the Jacksonville Traction Company since March, 1918. He is an alumnus of Georgia School of Technology. A successor to Mr. Brown as superintendent of transportation has not yet been named.

**C. L. Lammers,** for many years with the Broadhead companies, Jamestown, N. Y., has been appointed superintendent of the Jamestown Street Railway, Jamestown, Westfield & Northwestern Railway and the Chautauqua Traction Company in charge of traffic. He succeeds George L. Maltby, who resigned recently to enter the automobile business as referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 16, 1924.

**George A. Mills,** for the past six years general superintendent in charge of the Northern States Power Company property in Eau Claire, Wis., has resigned to become connected with the public service enterprises at Kewanee, Ill. These include the properties of the Consolidated Light & Power Company in Kewanee, Neponset, Sheffield and Galva, the municipal plant built by the city of Kewanee and the street and interurban properties.

**Charles Mulhado** has retired as president of the Gardner-Templeton Street Railway, Gardner, Mass. He plans to establish himself as an industrial engineer in Boston. Mr. Mulhado organized the company following receiver's sale of the Northern Massachusetts Street Railway on Jan. 1. Ralph Kelly has also retired as clerk and treasurer.

**W. G. Strait,** formerly of the Interborough Rapid Transit Company, New York, N. Y., has been promoted to the position of purchasing agent and general storekeeper of the New York Railways, New York City. Mr. Strait went to the Interborough on Dec. 1, 1903, as a stenographer in the office of J. S. Doyle, superintendent of car equipment. He was, in time, promoted to the positions of chief clerk, superintendent of economy and now he is assuming his new duties as purchasing agent and general storekeeper of the New York Railways.

**S. A. Bishop,** general claim agent of the Pacific Electric Railway, Los Angeles, Cal., was elected president of the Pacific Claim Agents' Association, at the convention held recently in Spokane, Wash.

**C. E. Bell,** who has been superintendent of the gas department of the Columbus Electric & Power Company, Columbus, Ga., and of the meter department of the lighting and power system, has been appointed to succeed to the duties relinquished by B. T. Longino as superintendent of the railway department of the company. Mr. Bell is a Kentucky man. He became connected with the local utilities at Columbus five years ago as manager of the gas department. He has already assumed his additional duties under a consolidation of the two departments as heretofore arranged.

**Berryman T. Longino,** for the past four and a half years superintendent of the railway department of the Columbus Electric & Power Company, Columbus, Ga., has been appointed general superintendent of the Eastern Texas Electric Company, Beaumont, Tex. Both companies are controlled by Stone & Webster. The Eastern Texas Electric Company, serves both Beaumont and Port Arthur with power and lighting service and operates an interurban service between the cities and the local railway service in them. Mr. Longino was graduated from the Georgia School of Technology in 1907. Following graduation he spent one year in the office of Stone & Webster. He was transferred to the Seattle Electric Company, Seattle, Wash., where he spent two years in the car shops and the transportation department. From 1909 to 1913 he was assistant superintendent of the Tacoma Railway & Power Company. He left the railway business to engage in banking, but in 1914 returned to the railway field with the Jacksonville Traction Company. Later he went with the Columbus Electric & Power Company.

**L. R. Ross,** former president of the New Brunswick Power Company, St. John, N. B., has been superannuated as terminal agent of the Canadian National Railways.

**Homer Loring** was elected chairman of the executive committee of the Boston & Maine Railroad on Aug. 19. Mr. Loring will assume charge of the road's finances and corporate matters at once, and by the end of the year will retire as chairman of the Massachusetts State Finance Commission. The Boston & Maine Railroad operates both the Portsmouth Electric Railway and the Concord Electric Railway. Mr. Loring is, perhaps, best know to electric railway executives as the former chairman of the trustees of the Eastern Massachusetts Street Railway. He it was who did most, perhaps, to secure the passage of the remedial legislation of 1918 under which the Bay State Street Railway was successfully reorganized.

**Miss Lois M. Anderson,** employed for the past year and a half in the Fowler, Ind., office of the Interstate Public Service Company, has accepted the position of assistant to the director of public relations in the company's office in Indianapolis. She will also assist Mrs. P. W. Evans in carrying out the program of the Women's Public Information Committee.

**M. Graham Fulton,** treasurer of the Mexico Tramways for a number of years, has resigned to accept a similar position in Brazil in connection with the companies controlled by the Brazilian Traction, Light & Power Company, Ltd. F. Wood, who has been for many years in the service of the Mexican Light & Power Company, Ltd., has been promoted to fill the position left vacant by Mr. Fulton's resignation. The headquarters of both the Brazil and Mexico companies are in Toronto, Canada.

**Daniel E. Lenahan** has been appointed superintendent of car equipment of the New York Railways, New York City. Mr. Lenahan began his railroad career on Dec. 22, 1902, as a foreman car-cleaner with the Interborough Rapid Transit Company, New York. He was in turn promoted to assistant carhouse foreman, power house foreman, general foreman. Then he went to the New York Railways as assistant general foreman and superintendent of the electric department. He returned to the Interborough as superintendent of inspections, and has now been promoted to superintendent of car equipment of the New York Railways.

**A. R. Frahm** has been appointed general superintendent of the local properties of the Northern States Power Company at Eau Claire, Wis., to succeed George A. Mills. These properties include more than 30 miles of electric railway. Mr. Frahm was formerly engaged in utility work at Grand Forks, N. D.

# Obituary

## Daniel Anderson Tomlinson

Daniel Anderson Tomlinson, manager of the railways bureau of the Portland Cement Association, Chicago, died on Aug. 7 while playing tennis at Evanston, Ill. Mr. Tomlinson joined the staff of the Portland Cement Association in 1920. Two years later he was promoted to the position he held when he died.

Mr. Tomlinson was born in Detroit in 1890. After a year at Lake Forest College he went to Massachusetts Institute of Technology, from which he was graduated in 1912. Later he took a special course at Armour Institute. For five years thereafter he was with the Chicago & Western Indiana Railroad as assistant engineer engaged in track elevation work, yard construction, valuation and studies on terminal facilities. He served in the Illinois National Guard on the Mexican Border and during the World War he was adjutant to the constructing quartermaster at Camp Grant, instructor at the officers' training camp there and at the coast artillery school at Fort Monroe,Va. He was discharged in 1919 as a captain of Coast Artillery.

For a few months he was manager of the Central Zone, professional and special section of the U. S. Employment Service, helping engineers get back into civilian work. Then for a year he served as assistant secretary of the American Association of Engineers, in charge of railroad and employment work.

---

**Richard Eick,** purchasing agent for the Arkansas Central Power Company, the successor of the Little Rock Railway & Electric Company, Little Rock, Ark., died on Aug. 11, after a long illness. Mr. Eick has spent all his life since manhood in the service of public utilities. He was born on Nov. 2, 1873, at Califou, N. J., and entered railroad work with the Public Service Railway at Newark, N. J. in 1897. A year later he was promoted to be superintendent of the Elizabeth division. He resigned in 1904 to accept a position as superintendent of transportation with the United Railways, San Francisco, Cal. In 1906 he resigned to accept a position with the Little Rock Railway & Electric Company. In 1917 he was promoted to the position of purchasing agent. Mr. Eick is survived by his wife and six daughters.

**James B. Peck,** for many years attorney for the Kansas City Railways, died at his home in Kansas City on Aug. 12. Mr. Peck went to Kansas City from Kentucky twenty-four years ago. He enrolled in the Kansas City School of Law and after graduation remained there to practice law. He was fifty-one years old.

**Thomas Wood,** pioneer electric railway builder, died recently at his home in Sandusky. He had charge of the construction of the line from Sandusky to Lorain which was formerly called the Sandusky & Interurban and which is now a part of the Lake Shore Electric System.

# Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

## Bus Heaters in Demand

Orders received by the N. A. Petry Company of Philadelphia for Petry heating valves to be installed on buses have been in such large volume that the company is now considering enlarging its manufacturing force in order to supply the demand. Among the users of this heating device are the Yellow Coach Manufacturing Company, the International Motor Company, the Fifth Avenue Coach Company, the Garford Motor Truck Company and the General Motors Truck Company.

## Honors Long-Service Employees

The Taylor-Wharton Iron & Steel Company recently held a celebration in honor of its employees longest in the service. The company has at its plant in High Bridge, N. J., 221 employees who have been in service more than fifteen years; ninety-nine who have served a quarter of a century or more, thirty who have been there thirty-five years; thirteen with more than forty-five years service and eleven with more than fifty years service. Testimonials were presented to these men in recognition of their work.

## Demand for Southern Yellow Pine on Increase

Many of the woods formerly used for poles are becoming scarce. The longer lengths are not only difficult to obtain but they are expensive. As it takes from 50 to 150 years to grow a pole-sized tree of these varieties compared with only 30 to 50 years to grow a southern yellow pine tree of suitable size, it is natural that the latter should gain in popularity. This wood is not only readily available, but it has physical properties which fit it well for use in poles.

Data concerning the strength of pine poles, correct methods of applying preservative treatment, and specifications describing desirable physical properties in a pole are given in a booklet recently published by the International Creosoting & Construction Company, Galveston, Texas. This 32-page booklet is attractive in form. It contains many illustrations, and much information of value to pole users. Charts are included which show a steadily increasing number of poles chemically treated. A supply of poles of standard sizes is carried on hand at all times by this company.

## Metal, Coal and Material Prices

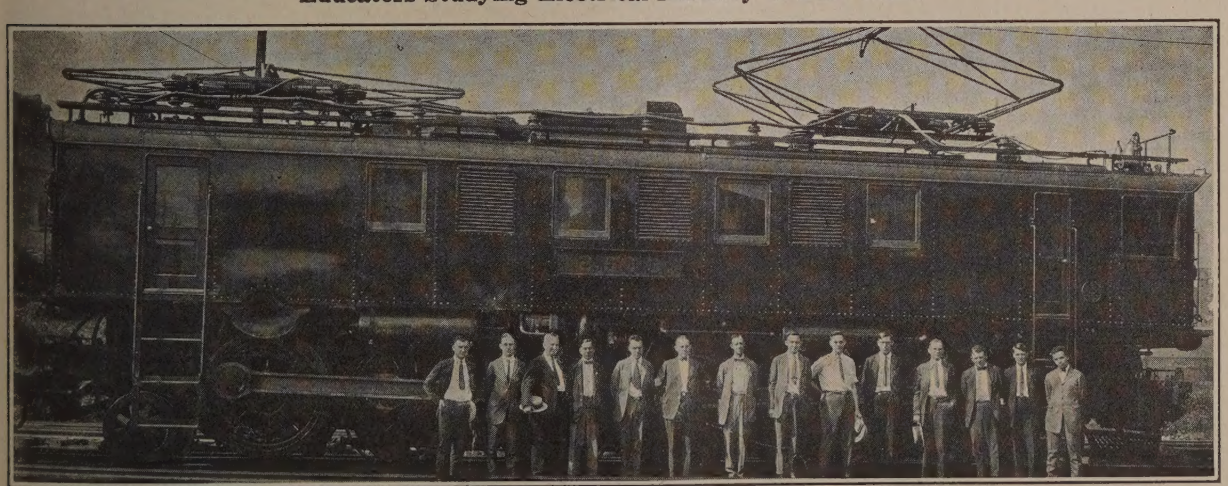
| Metals—New York | Aug. 19, 1924 |
|---|---|
| Copper, electrolytic, cents per lb | 13.562 |
| Copper wire base, cents per lb | 15.50 |
| Lead, cents per lb | 8.05 |
| Zinc, cents per lb | 6.60 |
| Tin, Straits, cents per lb | 52.625 |
| **Bituminous Coal f.o.b. Mines** | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons | $4.15 |
| Somerset mine run, Boston, net tons | 2.125 |
| Pittsburgh mine run, Pittsburgh, net tons | 1.875 |
| Franklin, Ill., screenings, Chicago, net tons | 1.85 |
| Central, Ill., screenings, Chicago, net tons | 1.625 |
| Kansas screenings, Kansas City, net tons | 2.50 |
| **Materials** | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft | $6.55 |
| Weatherproof wire base, N.Y., cents per lb. | 18.50 |
| Cement, Chicago, net prices, without bags | 2.20 |
| Linseed oil (5-lb. lots), N.Y., per gal | $1.07 |
| White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots | 10.12 |
| Turpentine (bbl. lots), N. Y., per gal | $0.91 |

## *Rolling Stock*

**Municipal Railway of St. Petersburg, St. Petersburg, Fla.,** has announced specifications for seven Birney cars and eight double-truck one-man safety cars recently ordered from the J. G. Brill Company. An interesting feature of these cars is that all the woodwork below the top sash will be treated by the G. W. Saums wood preservative process. The specifications for the double-truck cars follow:

| | |
|---|---|
| Date order was placed | July 14, 1924 |
| Date of delivery | Nov. 15, 1924 |
| Builder of car body | J. G. Brill |
| Type of car | Double truck safety |
| Seating capacity | 48 |
| Weight: | |
| Car body | 12,780 lb. |
| Trucks | 9,760 lb. |
| Equipment | 6,900 lb. |
| Total | 29,440 lb. |
| Bolster centers, length | 18 ft. |
| Length over all | 40 ft. 1 in. |
| Truck wheelbase | 5 ft. 1½ in. |
| Width over all | 8 ft. 5 in. |
| Height, rail to trolley base | 11 ft. |
| Body | Semi-steel |
| Interior trim | Mahogany |
| Roof | Arch |
| Air brakes | Three cars Westinghouse<br>Four " G. E. Co. |
| Armature bearings | Sleeve |
| Axles | 4-in. A.S.T.M. Spec. A-20-21 |
| Bumpers | Brill reinforced channel |
| Car signal system | Faraday |
| Car trimmings | Bronze |
| Center and side bearings | Brill standard |
| Conduits | Sheraduct |
| Control | K-35 |
| Couplers | Plain bar |
| Curtain fixtures | Curtain Supply Company |
| Curtain material | Pantasote |
| Destination signs | Hunter |
| Door operating mechanism, | National Pneumatic |
| Fare boxes | Johnson |
| Fenders | H. B. Lifeguard |
| Gears and pinions: | Three cars Westinghouse helical<br>Four " G. E. spur |
| Hand brakes | Brill |
| Heater Equipment | None |
| Headlights | Golden Glow |
| Journal bearings | Bronze babbitted |
| Journal boxes | Brill standard |
| Lightning arresters: | Three cars Westinghouse K-3<br>Four " G. E. M. D. |
| Motors | Three cars Westinghouse 506<br>Four " G. E. 264 |
| Motors | Inside hung |
| Paint | St. Petersburg grey |

## Educators Studying Electrical Industry at First Hand



The Westinghouse Electric & Manufacturing Company has just completed its fourteenth annual summer course for professors of electrical engineering. The group is here shown standing beside one of the new electric locomotives being built at East Pittsburgh, Pa., for the Norfolk & Western Railroad. This course is planned with a view to securing closer contact between teaching of electricity in schools and colleges, and the working of the electrical industry.

| | |
|---|---|
| Sash fixtures | Brill Renitent |
| Seats | Brill Waylo |
| Seating material | Rattan |
| Slack adjuster | Gould |
| Springs | Half-elliptic and coil |
| Step treads | Feralun |
| Trolley catchers | Earl |
| Trolley base | Simplex No. 3 |
| Trolley wheels | Ideal 4 in. |
| Trucks | Brill 77 E-1 |
| Ventilators | Brill exhaust |
| Wheels | 26-in. cast iron |

Special devices:

Fish pole carriers on side of car; rotary gongs, trombone 13-in. whistle.

The single-truck cars will weigh only 16,000 lb. and will have an over-all length of 28 ft. ½ in.; the width over all will be 7 ft. 10⅝ in. and the height, from rail to trolley base, will be 10 ft. 9 in.

**Worcester Consolidated Street Railway, Worcester Mass.,** is transforming its entire equipment into one-man cars. The work is being done in the company's own shops at something less than $100 for each car. The company has 287 cars and the number that can be operated as one-man cars is now 167. General Manager Page has stated that the cars will not necessarily be operated as one-man cars, but that they can be if that type of operation becomes desirable or necessary.

**Union Traction Company of Indiana, Anderson, Ind.,** has announced specifications on the 15 new steel combination passenger and baggage cars referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 16. These cars are to be arranged for single end operation and will be equipped with stationary seats. The control equipment will be Westinghouse HL so that the units may be operated in trains if desired. Detailed specifications follow:

| | |
|---|---|
| Date order was placed | July 28, 1924 |
| Date of delivery | February, 1925 |
| Builder of car body | St. Louis Car Company |
| Type of car | Passenger-baggage |
| Seating capacity | 54 |
| Weight: | |
| Car body | 49,000 lb. |
| Trucks | 24,000 lb. |
| Equipment | 17,000 lb. |
| Total | 90,000 lb. |
| Bolster centers, length | 38 ft. 6 in. |
| Length over all | 61 ft. 0 in. |
| Truck wheelbase | 7 ft. 0 in. |
| Width over all | 9 ft. 1 in. |
| Height, rail to trolley base | 12 ft. 11 in. |
| Body | Steel |
| Interior trim | Mahogany |
| Headlining | Steel |
| Roof, arch | Steel, wood and canvas |
| Air brakes | Westinghouse |
| Armature bearings | Plain |
| Axles | Union Traction standard |
| Bumpers | 12 in. |
| Car trimmings | Union Traction standard |
| Center and side bearings: | Standard Motor Truck Company |
| Control | Westinghouse HL |
| Couplers | Radial |
| Curtain material | Pantasote |
| Destination signs: | Union Traction standard |
| Fenders | Union Traction standard |
| Gears and pinions | Westinghouse helical |
| Hand brakes | St. Louis Car Company |
| Heater equipment | Hot water |
| Headlights | Golden Glow |
| Journal bearings | Plain 5 in. x 9 in. |
| Journal boxes | 5 in. x 9 in. |
| Motors | Four Westinghouse 333 VVD, Inside hung |
| Seats | Stationary |
| Seating material | Plush and leather |
| Springs | Standard Motor Truck Company elliptic and coil |
| Step treads | Kass safety |
| Trolley retrievers | Ohio Brass |
| Trolley base | Westinghouse |
| Trucks | Standard Motor Truck Company |
| Ventilators | Utility |
| Wheels | Rolled steel Union Traction |
| Power saving device | Economy Meters |

**Chicago Rapid Transit Company, Chicago, Ill.,** has sent out inquiries for bids on the construction of 100 new steel elevated cars which are to be similar in construction to the last group of 100 cars recently put in service. Bids are due Sept. 10.

## *Track and Line*

**Toronto, Can.**—At a special meeting of the Toronto Transportation Commission on Aug. 14 the agreement was executed between it and York Township for the construction and operation of car lines in the township by the Commission. The streets in the township which figure in the agreement are Oakwood Avenue, Eglinton Avenue, Rogers Road, and that section of Dundas Street between Runnymede Road and Lambton. Tenders for the construction work in connection with the agreement will be received by Aug. 25. Lines will be placed on Oakwood Avenue between St. Clair and Eglinton Avenues, a distance of 1¼ miles.

**Warren Street Railway, Warren, Pa.,** now a part of the Penn Public Service Company, has placed an order with the Lorain Steel Company of several special pieces of track work which include switches, frogs, curves and branchoffs. Since the operation of the railway by the Penn Public Service, thousands of dollars have been spent in rehabilitating tracks, roadbed and rolling stock. In the last four months more than 8,000 cross ties have been replaced which, alone, cost in the neighborhood of $12,000.

**New Brunswick Power Company, St. John, N. B.,** will relay 2 miles more of tracks before winter. Recently, the company relaid a half mile of track on what is known as the Fairville line. Orders have been placed for 80-lb. rail. It is estimated that the work will cost approximately $50,000. The new rails will be laid on the western side of St. John harbor.

**Alabama Power Company, Montgomery, Ala.,** will complete a new paving project in Cloverdale about Sept 1. The work began some weeks ago and is of high grade concrete.

**South Jacksonville Municipal Railway, South Jacksonville, Fla.,** has reported progress on the Fletcher Park extention. The rails will be laid on the parkway alongside Atlantic Boulevard.

**Spokane United Railways, Spokane, Wash.,** is rebuilding the tracks on Thirteenth Avenue between Wall and Stevens Streets and for one block on Stevens. The job includes 885 ft. of rebuilding work. This will include the installation of 7-in., 70-lb. T-rail and 7-in., 108-lb. grooved girder rail on the three curves in this area and the installation of new 4½-in., 60-lb. T-rail straight track. This job was started July 7 and will soon be ready for paving.

## *New Incorporation*

**Seabrook Electric Railway, Houston, Tex.,** has been incorporated with a capital stock of $1,000,000 to construct an interurban line between Houston and Seabrook, via Harrisburg, Pasadena, San Jacinto Battle Park, Morgan's Point, along the south side of the Houston Ship Channel, thence along bay shore via Bay Ridge, La Porte and Red Bluff. The headquarters of the company are to be in Houston. The directors are John H. Kirby, J. M. West, W. C. Munn, Joseph Rice, John S. Bonner, J. A. Cottingham, John H. Thompson and Jacob F. Wolters, Houston, and D. C. Giddings, Brenham.

## *Power Houses, Shops and Buildings*

**Milwaukee Northern Railway, Sheboygan, Wis.,** has completed negotiations with the Wisconsin Power & Light Company for the joint use of the new $75,000 terminal in Sheboygan. As a future development to supplement its passenger station business, plans are under consideration to build a freight depot when this part of the business is sufficiently developed.

**Los Angeles Railway, Los Angeles, Cal.,** has called for bids for an addition to the bus and automobile storage facilities. The entire ground floor space will be devoted to storage of motor vehicles. The building will be of brick construction throughout.

**Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio,** is building a $15,000 addition to its plant in Findlay to provide for increased power business.

## *New Advertising Literature*

**Electric Railway Improvement Company, Cleveland, Ohio,** has just issued a new descriptive circular picturing the full line of its well known "Erico" electric weld, brazed type, rail bonds. In addition to illustrations and data on the use of the various types of brazed bonds, many tables are given showing practically every dimension of each bond size.

**Electric Railway Equipment Company, Cincinnati, Ohio,** is distributing a folder whch shows in a convincing manner the improvement which has been effected in the appearance of the streets of Montgomery, Ala., by the instalaltion of "Elreco" poles. Twelve pictures are used, six taken before the change was made and six taken at the same points afterward. The installation in Montgomery was made during the early part of the present year and the inauguration of the new system of street lights on April 4 was the occasion of impressive ceremonies.

**Electrical Alloy Company, Morristown, N. J.,** has issued a pamphlet describing its welding rods, wires and strips. Information is given in regard to the characteristics of nickelchrome wire and the advantages of using this in certain work.